Air Quality Permitting
Statement of Basis

June 21, 2006

Permit to Construct No. P-050214

Bennett Forest Industries, Grangeville

Facility ID No. 049-00003

Prepared by: DP for

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AIR QUALITY DIVISION

FINAL PERMIT

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Acronyms, Units, and Chemical Nomenclature

AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
Btu	British thermal unit
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
gr/dscf	grain (1 lb = 7,000 grains) per dry standard cubic foot
HAPs	Hazardous Air Pollutants
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometer
lb/hr	pound per hour
MACT	Maximum Available Control Technology
MMBtu	Million British thermal units
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
NCASI	National Council of the Paper Industry for Air and Stream Improvement
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PM	Particulate Matter
PM_{10}	Particulate Matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	synthetic minor
SO_2	sulfur dioxide
T/R	transformer/rectifier
T/yr	Tons per year
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01 Section 201, Rules for the Control of Air Pollution in Idaho (Rules) for Permits to Construct.

2. FACILITY DESCRIPTION

Bennett Forest Industries will produce dimensional lumber products at the Grangeville facility. The processes include log storage, debarking, sawing, planning, drying of wood, final product storage, and distribution. Steam for the production processes will be generated by the Wellons boiler which will be fired by wood wastes generated onsite. Saleable products include the dimensional lumber, wood chips, bark and rosebud horse bedding.

3. FACILITY / AREA CLASSIFICATION

For purposes of the Title V permit program Bennett Forest Industries is defined under IDAPA 58.01.01.008.10.c as a major facility because the potential to emit any regulated air pollutant would exceed 100 tons per year. The AIRS classification is "A" because the potential to emit of PM, VOC, SO_2, CO, and NO_x exceed major source levels.

The facility is located within AQCR 63 and UTM zone 11. The facility is located in Idaho County which is designated as unclassifiable for all criteria pollutants (PM_{10}, CO, NO_x, SO_2, lead, and ozone).

The AIRS information provided in Appendix C provides the revised classification for each regulated air pollutant at Bennett Forest Industries. This required information is entered into the EPA AIRs database.

4. APPLICATION SCOPE

Bennett Forest Industries has submitted an application to modify PTC No. P-040214 that was issued on July 29, 2005. The modification addresses the following:

- Installation of new sawmill equipment including units for log handling, sawing, planning, chipping and material handling
- Add two drying kilns and increase the allowable lumber throughput for all kilns at the facility from 60 to 250 million board feet per year (MMbf/yr)
- Increase allowable boiler steam production rate

No other existing or new equipment requiring a permit to construct will be used at the site.

4.1 *Application Chronology*

10/4/05	EPA approved an alternative to 40 CFR 60.49b(d)
10/21/05	Application received
11/4/05	15-day pre-permit construction approval was issued
11/18/05	Application declared complete
12/9/05	CAM plan received
12/30/05	Bennett requested COMS alternative NSPS method approval from EPA
1/12/06	Additional TAP modeling info received
1/16/06	A Draft PTC was requested
2/2/06	Additional TAP information was received

2/9/06	Draft PTC was issued to the facility for review
2/16/06	Draft PTC was issued to the facility for review
2/24/06	Comments on the Draft PTC were received from the facility
4/12/06	Bennett provided information regarding applicability of Subpart Db
5/10/06	Draft PTC was issued to the facility for review
6/8/06	Comments on the Draft PTC were received from the facility

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC.

5.1 Equipment Listing

Table 5.1 SUMMARY OF REGULATED SOURCES

Source Description	Emissions Control(S)
Hog Fuel Boiler Manufacturer: Wellons Model No.: 2DS2C8.0A Rated steam rate: 80,000 pounds per hour Fuel value: 8,750 Btu per dry pound	Multiclone Manufacturer: Wellons Model No.: W-144 Air flow rate: 64,500 CFM at sea level & 350 °F. Electrostatic Precipitator Manufacturer: Wellons Model No.: Size No. 9 No. of T/R sets: 2
Three Moore Dry Kilns Manufacturer: Moore Length: 88 feet	Uncontrolled
Two Wellons Dry Kilns Manufacturer: Wellons Length: 88 feet	Uncontrolled
Cyclone 11 - Sawmill Sawdust	Baghouse Manufacturer: Clarke Sheet Metal Model No.: CSM 60-20
Cyclone 12 - Sawmill Sawdust	Uncontrolled
Cyclone 41 - Saw Sharpening Grindings	Uncontrolled
Cyclone 71 - Planer Chip Bin	Uncontrolled
Cyclone 72 - Planer Shavings	Baghouse Mfr: Clarke Sheet Metal Model No.: unknown
Cyclone 73 - Planer Shavings Truck Bin	Uncontrolled
Cyclone 74 - Rosebud Bldg Planer Shavings (non-point source; vents into bldg)	Uncontrolled
Fugitive Dust Sources Includes but not limited to: roads, saws, debarker, disc screen, conveyors, material transfer/drop points, etc.	Dust control in accordance with a Fugitive Dust Control Plan

5.2 Emissions Inventory

Emissions from the modified sources and from new sources at this facility were estimated by the applicant and reviewed by DEQ. For details, refer to the worksheets included in Appendix A. Tables 5.2 and 5.3 show the estimated emissions of the pollutants which may be emitted from point sources following issuance of the permit. The basis for these estimates is as follows:

For the Boiler, the allowable Btu usage rate was 498,750 MMBtu input per year in the existing permit. The application requested to increase this rate to the rated heat input rate of 115.7 MMBtu/hr and 1,014,001 MMBtu/yr (115.7 MMBtu/hr * 8760 hr/yr = 1,014,001 MMBtu/yr) for purposes of all analyses. For the kilns, the allowable kiln production rate was 60 million board feet (MMbf/yr) in the existing permit. The application requested to increase this to 250 MMbf/yr.

The hazardous air pollutant (HAP) emissions were also estimated; refer to IDAPA 58.01.01.008 in the Regulatory Review Section below for details.

Table 5.2 EMISSION INVENTORY - CONTROLLED EMISSIONS

Source	PM[a]		PM_{10}[b]		Nitrogen Oxides		Sulfur Dioxide		Carbon Monoxide		VOC[c]	
	(lb/hr)[d]	(T/yr)[e]	(lb/hr)[d]	(T/yr)[e]	(lb/hr)[d]	(T/yr)[e]	(lb/hr)[d]	(T/yr)[e]	(lb/hr)[d]	(T/yr)[e]	(lb/hr)[d]	(T/yr)[e]
Boiler	11.6	51	6.6	28.9	29.0	127	27.2	119	23.2	101	5.8	25
All Kilns (combined emissions)	9.82	41	5.65	24	---	---	---	---	---	---	44.6	188
Cyclone 11	0.02	0.04	0.020	0.04	---	---	---	---	---	---	---	---
Cyclone 12	0.64	1.29	0.520	1.0	---	---	---	---	---	---	---	---
Cyclone 41	0.0015	0.003	0.0012	0.0024	---	---	---	---	---	---	---	---
Cyclone 71	0.99	1.97	0.49	0.99	---	---	---	---	---	---	---	---
Cyclone 72	0.22	0.45	0.22	0.45	---	---	---	---	---	---	---	---
Cyclone 73	2.8	5.6	1.40	2.8	---	---	---	---	---	---	---	---
Total:	---	101	---	58	---	127	---	119	---	101	---	213

a) Particulate Matter
b) Particulate Matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
c) Volatile Organic Compounds
d) Pounds per hour
e) Tons per year

The entire boiler toxic air pollutant emission (TAP) estimates list is included in Appendix A. The TAPs that exceeded the acceptable ambient concentrations specified in IDAPA 58.01.01.585 and 586 are shown in Table 8 in the modeling memorandum in Appendix B.

5.3 Modeling

The modeling memorandum is included as Appendix B. The results show that the facility has demonstrated compliance with the NAAQS and with IDAPA 58.01.01.210, 585 and 586 to the satisfaction of DEQ. Refer to the memorandum for details.

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201, 213 .... Permit to Construct Requirements

The installation of new sources and the modification of existing sources at the Grangeville facility require a PTC. In addition, the permittee has complied with the requirements under IDAPA 58.01.01.213 and a pre-permit construction approval was issued by DEQ on November 4, 2005.

IDAPA 58.01.008.10 .... Major Source Classification

A condition which limits facility-wide HAP emissions to less than the major source threshold was included in the permit as requested by the facility. Corresponding operating, monitoring, and recordkeeping requirements were added also as a means of demonstrating compliance with the HAP emissions limits. Separate monitoring and recordkeeping requirements were established for the 10 TPY limit and the aggregate 25 TPY limit so that compliance would be more clear. Upon review of the emission estimates, the only HAP that approaches the 10 TPY limit for a single HAP is methanol, *therefore, this is the only HAP for which records need to be maintained to show compliance with the 10* TPY limit. With regard to the aggregate 25 TPY limit for all HAPs, only the kilns and the wood-fired boiler will emit HAPs, therefore, monthly records of HAP emissions are required to be maintained only for these sources.

IDAPA 58.01.01.203.02, 577................ National Ambient Air Quality Standards (NAAQS)

Compliance with the NAAQS was demonstrated in Section 6 of the application. The permittee's analysis was reviewed and found to be consistent with DEQ methods and procedures. Refer to the modeling memorandum in Appendix B for details.

IDAPA 58.01.01.203.03, 210................ Toxic Air Pollutants (TAPS)

Compliance with the TAP requirements was demonstrated in Section 6 of the application. For most TAPs, the uncontrolled emission rates were found to be emitted below the screening emissions level (EL) for this project, and this meets IDAPA 58.01.01.210.05. For the remaining TAPs that had uncontrolled emission rates above the EL, except formaldehyde, it was demonstrated that the uncontrolled ambient concentration at the point of compliance would be less than the applicable acceptable ambient concentration listed in Sections 585 and 586 of the Rules, and this meets IDAPA 58.01.01.210.06. Refer to the modeling memorandum in Appendix B for more information.

With regard to formaldehyde, compliance was demonstrated based on uncontrolled operation of the boiler and controlled operation of the kilns (i.e., the heat input rate for the boiler equals or exceeds the rated capacity, and kilns were evaluated at less than the maximum production rate when using the worst case wood species, Lodgepole). The kiln emission rates used in the analyses are "controlled emission rates" as defined by IDAPA 58.01.01.210.02.c since operational/production limitations were assumed. On this basis, compliance was demonstrated with IDAPA 58.01.01.208 by showing that the kilns' "controlled ambient concentration" at the point of compliance is less than the applicable acceptable ambient concentration as listed under IDAPA 58.01.01.586. Under 58.01.01.208.c, it is required that emission limits be included in the permit that correspond to the emission rates used in the modeling analysis. Therefore, a kiln formaldehyde emission limit, and the corresponding operating monitoring and recordkeeping requirements for showing compliance with the limit, were derived as follows:

The kiln formaldehyde annual-average emission rate used in the model = 0.065 lb/hr

Kiln formaldehyde emission rate increase = (0.065 lb/hr)(8760 hr/yr) = 570 lb/yr

Existing permit emission limit for formaldehyde = 144 lb/yr

New kiln formaldehyde emission rate limit = 144 lb/yr + 570 lb/yr = 714 lb/yr

The actual emission rate is dependent upon the species of wood processed in the kiln. It is noted that two species would have the potential to exceed the 714 lb/yr limit as shown below:

Uncontrolled lodgepole formaldehyde = (250 MMbf/yr)(4.0 lb/MMbf) = 1000 lb/yr

Uncontrolled white fir formaldehyde = (250 MMbf/yr)(2.9 lb/MMbf) = 725 lb/yr

Compliance with the kiln formaldehyde emission limit may be demonstrated by performing the following actions on a monthly basis: monitoring and recording the quantity of each species of wood processed in the kilns; calculating and recording formaldehyde emissions for each wood species, and then summing the results using the actual production records.

The approach used in this permit for establishing operating, monitoring and recordkeeping requirements will continue to allow flexibility to dry any wood species, within the allowable limits, while still maintaining compliance with the standards specified in IDAPA 58.01.01.585-586.

IDAPA 58.01.01.205, 40 CFR 52 .... Permit Requirements for New Major Facilities or Major Modifications in Attainment or Unclassifiable Areas; PSD

The requirements for major facilities do not apply to Bennett Forest Industries since the facility is not a major source as defined under IDAPA 58.01.01.205 [52.21(b)(1)]. The facility is not one of the listed sources in this definition and it will not emit or have the potential to emit 250 tons per year or more of a regulated NSR pollutant, which includes VOC.

IDAPA 58.01.01.301, 313 .... Requirement to Obtain a Tier I Operating Permit

In accordance with IDAPA 58.01.01.313.01(b), the owner or operator of the Tier I source shall submit to DEQ a complete application for an original Tier I operating permit within twelve (12) months after becoming a Tier I source or commencing operation. Therefore, a condition to require submittal of the Tier I operating permit application was included in the Facility-wide Section of the PTC.

IDAPA 58.01.01.590, 40 CFR Part 60..........New Source Performance Standards (NSPS)

On October 4, 2005, a letter was issued from EPA Region 10 to Bennett Forest Industries concerning monitoring requirements under 40 CFR 60.49b(d). A copy of the letter is included in Appendix D. This letter includes the following statements and the corresponding permit conditions were changed accordingly:

"EPA determines that if BFI is subject to the more stringent emission limit for particulate matter of 0.10 lb/million Btu and a restriction to combust only wood, the requirement to record the amount of wood combusted each day is not needed for the purposes of calculating the annual capacity factor, as required by Subpart Db §60.49b(d)." ... "If BFI is required to monitor the fuel usage for some other reason, EPA has also determined that BFI's proposal to monitor the fuel usage based upon steaming rate is acceptable."

On February 27, 2006, EPA issued a final rule amendment to 40 CFR Part 60 Subpart Db (71 FR 9866). The amended standards apply to "those units that begin construction, modification, or reconstruction after February 28, 2005." On April 12, 2006 the facility provided information to DEQ which indicates that "BFI and Wellons finalized a contractual agreement to order the boiler consistent with agreed upon specifications on August 16, 2004 with a PO from BFI to Wellons." Based on this information that a purchase order for this boiler was entered into prior to February 28, 2005, it has been determined that the Wellons Boiler is not subject to the amended NSPS standards under Subpart Db.

IDAPA 58.01.01.591, 40 CFR Part 61 & 63.........National Emissions Standards for Hazardous Air Pollutants (NESHAP)

Facility emissions will remain below the HAP major source threshold of 10 TPY of any one HAP or aggregate HAP emissions of 25 TPY. Therefore, 40 CFR 63 Subpart DDDD will not apply to the facility as a result of this permit modification. Information from the original analysis for this facility is repeated below for convenient reference.

40 CFR 63 Subpart DDDD..................... NESHAPS: Plywood and Composite Wood Products

63.2231 Does this subpart apply to me?

This subpart applies to you if you meet the criteria in paragraphs (a) and (b) of this section, except for facilities that the Environmental Protection Agency (EPA) determines are part of the low-risk subcategory of PCWP manufacturing facilities as specified in appendix B to this subpart.

(a) You own or operate a PCWP manufacturing facility. A PCWP manufacturing facility is a facility that manufactures plywood and/or composite wood products by bonding wood material (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a structural panel or engineered wood product. Plywood and composite wood products manufacturing facilities also include facilities that manufacture dry veneer and lumber kilns located at

any facility. Plywood and composite wood products include, but are not limited to, plywood, veneer, particleboard, oriented strandboard, hardboard, fiberboard, medium density fiberboard, laminated strand lumber, laminated veneer lumber, wood I-joists, kiln-dried lumber, and glue-laminated beams.

(b) The PCWP manufacturing facility is located at a major source of HAP emissions. A major source of HAP emissions is any stationary source or group of stationary sources within a contiguous area and under common control that emits or has the potential to emit any single HAP at a rate of 9.07 megagrams (10 tons) or more per year or any combination of HAP at a rate of 22.68 megagrams (25 tons) or more per year.

Bennett Forest Industries has HAP emissions of less than 10 tons per year of any single HAP and less than 25 tons per year of combined HAPs. 40 CFR 63.2231(a) includes lumber kilns located at any facility as applicable. 40 CFR 63.2231(b) includes facilities that emit or have the potential to emit any single HAP at a rate of 10 tons per year or more or any combination of HAPs at a rate of 25 tons per year or more. 40 CFR 63.2231 specifies that the subpart applies if the facility meets the criteria of both (a) and (b). Bennett Forest Industries meets the criteria of (a) but not of (b) since the federally-enforceable permit conditions established by this permit limit the potential to emit of HAPs to less than 10 tons per year of any single HAP and to less than 25 tons per year of any combination of HAPs. Therefore, 40 CFR 63 Subpart DDDD does not apply to Bennett Forest Industries.

IDAPA 58.01.01.650-651........................ Rules for Control of Fugitive Dust

Addition of the sawmill operations will add additional fugitive dust sources to the facility such as conveyors, debarking, sawing, and truck loading. Details are provided in Section 3 of the PTC application showing how emissions of fugitive dust will be controlled. For purposes of implementing these measures, and maintaining future compliance, the permit sets requirements for development, approval and implementation of a site-specific Fugitive Dust Control Plan.

IDAPA 58.01.01.700............................... Particulate Matter - Process Weight Limitations

The process weight rule applies to each of the new cyclones and each of the kilns. The emissions are limited according to the equation in the rule. A worksheet was prepared to compare the controlled PTE of each source to the standard and it was determined that each source would be in compliance. A copy of the worksheet is included in Appendix A.

40 CFR Part 64.. Compliance Assurance Monitoring (CAM)

CAM rules are applicable requirements for the boiler for Title V permitting purposes but it is not necessary to address them as part of this PTC. Instead, per 40 CFR 64.5(a)(1) the owner or operator shall submit information to comply with the CAM rules as part of the Tier I operating permit application. Details regarding applicability of the CAM rules are provided below.

Applicability is evaluated on a pollutant-specific basis for each emissions unit as follows:

- Under 64.2(a)(1), the boiler is subject to numerous emission limitations or standards, including the following: NAAQS for SO_2 and PM_{10}; IDAPA 58.01.01.676 (fuel burning equipment grain loading standard) for PM; and NSPS for PM.
- Under 64.2(a)(2), the boiler uses an ESP control device to achieve compliance with the emission limitations and standards listed above for PM_{10} and PM. Part 64 does not apply with regard to any other regulated air pollutants because the boiler does not use a control device to achieve compliance with any of the emission limitations or standards for those pollutants.
- Under 64.2(a)(3) the boiler has potential pre-control device emission of PM that are greater than 100 TPY.
- The CAM exemptions under 64.2(b) do not apply to this source.

5.5 Fee Review

A PTC application fee of $1000 was received on October 21, 2005 and a PTC processing fee of $7,500 was received on February 16, 2006 per IDAPA 58.01.01.224-225. The fee is based on the facility's permitted emissions increase, excluding fugitive emissions, which exceeds 100 tons per year.

Table 5.5 PTC PROCESSING FEE SUMMARY

Emissions Inventory	
Pollutant	**Permitted Emissions Increase**
NO_X	64
SO_2	61
CO	52
PM_{10}	34
VOC	155
TAPS/HAPS	13
Total:	<100
Fee	$ 7,500.00

6. PERMIT CONDITIONS

This section lists permit conditions that are written for operations, monitoring, recordkeeping, and testing.

Permit Condition 2.1

This condition was modified to include requirements for development, approval and implementation of a site-specific Fugitive Dust Control Plan for purposes of maintaining compliance with the rules for Control of Fugitive Dust, IDAPA 58.01.01.650-651.

Permit Condition 2.15

A condition to require submittal of a Tier I operating permit application was included in the Facility-wide Section of the PTC in accordance with IDAPA 58.01.01.313.01.b.

Permit Conditions 3.3 and 3.12 of the July 29, 2005 PTC

This permit condition was deleted. The CO emissions limit was included in the July 29, 2005 PTC because the uncontrolled PTE was higher than an applicable major source threshold (100 TPY for Title V purposes) and because actual CO emissions are, in many cases, variable for wood fired boilers. However, since the facility will become subject to Title V requirements upon issuance of this permit, and the uncontrolled PTE is no longer near an applicable major source threshold (e.g., 250 TPY for PSD) then a CO limit is no longer necessary for this source. The CO test requirement was removed also since the CO emission limit no longer exists, and even when variability of CO emissions was considered, compliance with the CO NAAQS is demonstrated.

Permit Conditions 3.3, 3.7, 3.8, 3.10, 3.13 and 3.15

Compliance with the NAAQS was demonstrated at the controlled emission rate. Since emissions at an uncontrolled rate would cause an exceedance of the PM_{10} NAAQS, and compliance at the controlled emission rate is close to the 24-hour standard, an emission rate limit was established to assure future compliance with the PM_{10} standards. The PM_{10} emission rate limit of 6.6 lb/hr corresponds to the emission rate used in the model to demonstrate compliance with the NAAQS. Compliance is demonstrated by meeting the following: existing permit requirements for the installation and operation of the multi clone and electrostatic precipitator control systems; the new requirement for periodic PM_{10}

performance tests; and the revised daily steam production limit that corresponds to the firing rate presented in the NAAQS compliance demonstration in the PTC application. Permit Condition 3.7 establishes the revised daily steam production limit, based on the manufacturers revised steam heat value (995 BTU/lb-steam) and boiler efficiency (68.8%) as follows:

Operating limit = (115.7 MMBtu/hr)(24 hr/day)(0.688)(lb-steam/995 BTU) = 1.92 MM lb-steam/day

Consistent with the original PTC for this project, as a part of testing, records of a wood waste fuel analysis and the amount of steam produced are required to ensure that the testing is conducted under normal operating conditions. Also, records of the power input to the ESP are required to show that conditions during testing are consistent with the ESP operating requirements under Permit Condition 3.8.3.

Permit Conditions 4.4, 4.5, 4.10 and 4.11

Formaldehyde emission limits and operating, monitoring and recordkeeping requirements are established for the kilns to demonstrate compliance with IDAPA 58.01.01.210.08. Compliance with the kiln emission limit is demonstrated by calculating and recording formaldehyde emissions on a monthly basis using the actual kiln production records. Refer to IDAPA 58.01.01.203.03, 210 in the regulatory analysis section above and the modeling memorandum in Appendix B for additional information.

Permit Conditions 3.8, 3.12, 3.13 and 3.14

Monitoring conditions for the ESP were changed. The requirement to establish a three-hour average power input level were replaced by requirements to establish and comply with the following operating parameters in the O&M manual, based on manufacturer's recommended settings: secondary voltage, amperage, power and spark rate input to each T/R set of the ESP and the spark rate. Within one year of issuance of this permit, a CAM plan will be submitted as part of the Tier I operating permit application, and at that time additional monitoring details will be developed for the multiclone and ESP.

Permit Conditions 3.9, 3.11 and 3.12

In a letter to EPA Region 10 dated December 23, 2005, Bennett Forest Industries requested alternative methods for complying with the boiler COMS requirements under 40 CFR 60 Subpart Db. As a result, the requirements to comply with these rules as given in these permit conditions was changed by adding the words "or per an EPA-approved alternative." In this way the permit will not preclude compliance from being achieved by following an EPA-approved alternative to these rules.

Permit Conditions 3.10.2 and 3.10.3

Condition 3.10.3 was deleted and Condition 3.10.2 was changed to be consistent with the following EPA determination issued on October 4, 2005 for this facility: "*EPA determines that if BFI is subject to the more stringent emission limit for particulate matter of 0.10 lb/million Btu and a restriction to combust only wood, the requirement to record the amount of wood combusted each day is not needed for the purposes of calculating the annual capacity factor, as required by Subpart Db 60.49b(d).*"; and on page 2 of the letter "*...there is also no need for BFI to calculate the annual capacity factor for wood..*" A copy of the EPA applicability determination letter is included in Appendix D.

Permit Conditions 3.13

The ESP power monitoring requirements were changed to make the units of measure and averaging time more apparent. This monitoring needs to be done consistently with the manufacturer's information maintained per the O&M manual requirements.

Permit Conditions 3.18 and 3.19

Requirements to follow the NSPS General Provisions given under 40 CFR 60 Subpart A, including those for reporting under 60.4, were added to make it more clear that these requirements apply to the boiler.

Permit Conditions 4.3, 4.8, 4.9 and 4.11

In Section 8 of the PTC application a permit condition was requested to track monthly running total HAP emissions from the facility and to verify that HAP emissions remain below the major source threshold. The HAP major source threshold is no more than 10 tons per year of any one HAP (methanol is the only pollutant which could possible reach this limit) and no more than 25 tons per year of any combination of any HAPs. On this basis, HAP emission limits and associated monitoring were added to the permit.

Permit Conditions 4.5, 4.6, 4.12 and 4.13

The application indicates that baghouses will be installed to control PM emissions from Cyclones 11 and 72 and the controlled emission rates from these sources were used in the analysis for demonstrating compliance with the PM_{10} NAAQS. Therefore, to assure that actual emissions remain consistent with the NAAQS analysis, operating requirements were added to the permit for installation and use of these two baghouses. In addition, monitoring and recordkeeping requirements in the form of an O&M manual and pressure drop monitoring were also added to assure compliance for these sources.

Permit Condition 4.11

The kiln throughput monitoring requirement was changed to require records of individual species of wood processed. This information is needed since different species have different emission factors for estimating emissions of HAPs and formaldehyde. This information is also needed to comply with other operating and monitoring requirements in Section 4 of the permit.

7. PERMIT REVIEW

7.1 *Regional Review of Draft Permit*

On February 6, 2006, and May 1, 2006, draft permit documents were provided to the DEQ Lewiston Regional Office for review. Issues regarding ESP operations and monitoring, fugitive dust control, O&M manual requirements, and baghouse monitoring were raised and resolved.

7.2 *Facility Review of Draft Permit*

Draft permits were issued to Bennett Forest Industries for review on February 9, 2006 and February 16, 2006. Issues regarding the production rate of the boiler and the addition of a fifth kiln (with no increase in the requested overall production rate) were resolved. On May 10, 2006, another draft permit which incorporates the fifth kiln was provided to the facility for review, and the following comments were received on June 8, 2006:

> Comment 1, Conditions 4.7 and 4.12: Please change "Within 30 days … install, maintain, and operate … equipment to measure the pressure differential across each baghouse" in Section 4.7 to "Within 90 days". Please make the same change in required timing for the baghouse O&M manual in Section 4.12.
>
> Response: The 30-day requirement was not changed. This time interval for installation of pressure drop monitoring equipment is considered to be reasonable, and it is typical of the requirements included in nearly all similar permits issued for baghouses in the state.

Comment 2, Condition 4.13: Please change "measure and record the following information on a weekly basis: (the pressure drops across each baghouse)" to "check on a weekly basis and plan maintenance when needed, record on a monthly basis".

Response: This monitoring requirement was not changed. Again, this monitoring frequency for a baghouse is typical and consistent with the monitoring requirements included in similar permits issued for baghouses in the state. In addition, it is recommended that the procedures included in the O&M Manual (Permit Condition 4.12) include provisions for having someone observe the baghouse pressure drop on a daily basis during each day that a baghouse is operated; this action would serve as one of the methods to show that the control device is "maintained in good working order and operated as efficiently as possible."

Comment 3, Condition 3.13: In section 3.13 pertaining to recordkeeping for the boiler operators, could we change the wording on 3.13 to say report hourly readings regularly, including at least three times per 12 hour operator shift? That is much more practical and doable than compliance issues if the operator misses any hour, which seems unavoidable.

Response 3: The monitoring interval was changed to be "at least once every four hours." This monitoring interval was confirmed to be sufficient upon review of the detailed information on automatic system operations (i.e., system operation is pre-set and not adjustable on a regular basis by the boiler shift operators) as presented in the "Wellons' Manual for the Electrostatic Precipitator" (ESP). The new ESP installed at the Grangeville facility is equipped with an automatic voltage control (AVC) system and a rapper automatic control system which are described on pages 7-9 of the "User's Manual" as follows:

"Each high voltage field is computed independently by a microprocessor-based controller; this is the SQ-300 interface, a dedicated controller at the AVC panel. Wellons configures the controller settings during startup. Each controller has a keypad with a data display mounted on the door of the AVC panel Each controller automatically calculates the voltage applied to the electrodes, by continuously verifying spark-over voltage and making the necessary adjustments. The precipitator obtains maximum efficiency when the voltage on the electrodes is as high as possible without exceeding the programmed spark rate. The controller also provides several protective functions for the T/R sets and associated equipment. It has a display for monitoring precipitator readings, and it controls alarm functions."

"The rappers hit striker plates attached to the collector plates, electrodes, and diffuser plates to knock loose the particulate. They act much like sledge hammers. Collector plate rappers strike the frame holding the collector palates. The high voltage rappers strike the bar that supports the electrode rack. Rappers operate through a quick on-off cyclical signal. Energizing a rapper lifts a cylindrical metal slug. Once the rapper is de-energized, the slug falls and strikes the striker plate. The rapper control panel on the roof controls the pulse rate and intensity of the raps. The rapper automatic control system is located in the rapper control panel which is mounted on the roof of the precipitator. The rate (how often the rappers run) and the intensity (how high the rapper is lifted) can be adjusted by use of the interface panel[which is programmable]."

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided from November 30, 2005, through December 30, 2005, in accordance with IDAPA 58.01.01.209.01.c. No comments were received, and no person or entity has requested a public comment period.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that Bennett Forest Industries be issued PTC No. P-050214 for the Grangeville facility. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

KH/bf Permit No. P-050214

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APPENDIX A

P-050214

Emissions Inventory

5.0 EMISSIONS INFORMATION AND DOCUMENTATION

5.1 Emission Estimates

Table 5-1 below summarizes the emission inventory for increases in emissions as a result of the proposed action. Table 5-2 provides facility-wide emission inventory after the proposed action. The emissions shown are the potential to emit (PTE) for the modification (Table 5-1), and for the facility after the modification (Table 5-2). Details on the emission inventory and the assumptions and calculations supporting it are available in Appendix D. Throughputs at each process or fugitive emission point are also visually documented on the process flow diagrams.

The entries show the potential emissions for all facility sources deemed to have measurable emissions. All conveyors carrying any fine materials, and virtually all carrying any wood waste, are enclosed with sides at least 23" high above a conveyor 26 inches or less wide. Material is expected to be well below the sides of the conveyors at all times. Many of the conveyors will be within buildings, under or surrounded by equipment keeping wind off the conveyors, and/or have much higher sides. Discussions with IDEQ permitting engineer, and acting permitting manager Carole Zundel September 21 and September 23 verified that IDEQ concurs that as long as transfers from conveyors are quantified as transfer emissions, no emissions will occur or need to be quantified from the conveyors themselves, except those whose sides are insufficient to keep all transported material well away from wind. The emissions from those few conveyors with sides insufficient to eliminate wind erosion of materials being transported are quantified in the emission inventory and included in the summary tables in this section. Storage emissions quantified are limited to the log yard waste pile, open to the wind but containing mostly large, moist material, and the ash hopper. All other storage bins are sealed, and have no emissions other than the transfers into and out of them, which are quantified as transfer emissions. All drops onto and from conveyors are identified as transfer points. Emission calculations are provided for the more than 40 transfer points, some of which have little or no emissions because any potential emissions are physically fully contained.

All facility cyclones are considered process equipment rather than pollution equipment because they all separate out materials that are directly used as boiler fuel or saleable products, or are subsequently processed into boiler fuel or saleable products.

All emission rates and documentation on the derivation of emission factors, emission calculations, and emission control efficiencies are included in the detailed emission inventory in Appendix D. Manufacturer's specifications for the boiler, including HAP emissions per MMBtu/hr, are also in the Emission Inventory in Appendix D. This emissions summary shows that this proposed modification would represent a minor modification to a synthetic minor facility. The combined emissions after the modification would make the facility major under Title V, but would remain well below the PSD major source threshold with the enforceable permit conditions recommended. Therefore, the facility would be required to submit a Title V Operating Permit application within 12 months of this PTC modification being issued.

Permit limits recommended on the total volume of lumber through the dry kilns will control the potential to emit for all processes except the boiler, and will effectively keep all emissions facility-wide at or below values in the facility emission inventory. Recommended permit limits on dry kiln throughput and boiler steaming rate in Section 8 will ensure that the Potential to Emit (PTE) does not exceed the major source threshold for HAP emissions.

Table 5-1 Total Potential Emissions After the Proposed Action

	PM	PM 10 w/ condens	VOC's	SO 2	CO	NOx	Lead	Total HAPs
Point Sources	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr
Boiler	50.70	28.90	25.35	119.16	101.40	126.75	0.024	14.76
Stacks (Cyclones and BHs)	9.35	5.31	NA	NA	NA	NA	NA	NA
Dry Kilns	41.25	23.75	187.50	NA	NA	NA	NA	10.12
Point Source Totals	**101.30**	**57.96**	**212.85**	**119.16**	**101.40**	**126.75**	**0.024**	**24.88**
Fugitives								
Processes (sawing ...)	2.63	1.39	NA	NA	NA	NA	NA	NA
Transfers (drops and conveyors)	12.99	4.89	NA	NA	NA	NA	NA	NA
Storage	0.11	0.06	0.004	NA	NA	NA	NA	NA
Vehicle Traffic	73.90	23.31	NA	NA	NA	NA	NA	NA
Fugitives *Subtotal*	**89.63**	**29.65**	**0.004**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

PLANTWIDE TOTAL	**190.9**	**87.6**	**212.9**	**119.1**	**101.4**	**126.8**	**0.02**	**24.88**

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Table 5-2 Increase in Potential Emissions As a Result of the Proposed Action

	PM	PM 10 w/ condens	VOC's	SO 2	CO	NOx	Lead	Total HAPs
Point Sources	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr
Boiler	25.78	14.69	12.88	60.54	51.53	64.41	0.012	5.24
Stacks (Cyclones and BHs)	9.35	5.31	NA	NA	NA	NA	NA	NA
Dry Kilns	31.35	16.05	142.50	NA	NA	NA	NA	7.69
Point Source Totals	66.46	33.66	155.38	60.54	51.53	64.41	0.012	12.93
Fugitives								
Processes (sawing ...)	2.63	1.39	NA	NA	NA	NA	NA	NA
Transfers (drops and conveyors)	5.86	4.89	NA	NA	NA	NA	NA	NA
Storage	-4.89	-2.85	0.004	NA	NA	NA	NA	NA
Vehicle Traffic	52.45	19.13	NA	NA	NA	NA	NA	NA
Fugitives Subtotal	56.05	22.57	0.004	0.00	0.00	0.00	0.00	0.00
PLANTWIDE TOTAL	122.5	56.1	155.4	60.5	51.5	64.4	0.01	12.93

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BOILER EMISSIONS

RECEIVED

FEB 24 2006

Department of Environmental Quality
State Air Program

[redacted]

80,000 pph Boiler, to be operated at only 35,000 pph
Actual final stack height will be 71.5 ft

		ASSUMPTIONS	CALCULATIONS	
	8,400	Operating hours/yr	28,500	BD tons burned over the year
	28,500	BDT burned/yr (from flow schematic)	8,750	BTU value/ BD lb
	50,000	G Tons burned/yr (assume 43% mc)	498,750,000,000	BTU consumed/yr
			498,750,000	or M BTU/yr input
heat input:	8,750	BTU/Dry lb	498,750	or MM BTU/yr input

Boiler Effic: 65%
Fuel Value: 1,100 BTU for lb at

Pollutant	EF	QTY	Units	lb/yr	tons/yr	oper. hours	120% Max lb/hr	avg lb/hr
CO	0.200	498,750	MMBTU input	99,750	49.88	8,400	14.25	11.88
PM	0.100	498,750	MMBTU input	49,875	24.94	8,400	7.13	5.94
PM10	0.04	498,750	MMBTU input	19,950	9.98	8,400	2.85	2.38
Condensibles	0.02	498,750	MMBTU input	8,479	4.24	8,400	1.21	1.01
VOC	0.050	498,750	MMBTU input	24,938	12.47	8,400	3.56	2.97
NOx	0.25	498,750	MMBTU input	124,688	62.34	8,400	17.81	14.84
SOx	0.235	498,750	MMBTU input	117,206	58.60	8,400	16.74	13.95
Pb	0.000048	498,750	MMBTU input	23.9	0.012	8,400	0.00	0.0029

208.2 Total tons/yr (not double counting PM10 or codens

EF References:

PARAMETER	EF		REFERENCE
CO	0.200	lb/MMBTU input	Manufacturer predicted Emission levels
PM	0.100	lb/MMBTU input	Manufacturer predicted Emission levels
PM 10	0.040	lb/MMBTU input	Ap42 Table 1.6-1 Updated Sept 2003
VOC	0.05	lb/MMBTU input	Manufacturer predicted Emission levels
NOx	0.25	lb/MMBTU input	Manufacturer predicted Emission levels
SOx	0.235	lb/MMBTU input	Manufacturer predicted Emission levels
Pb	0.000048	lb/MMBTU input	AP-42 Table 1.6-4 Dated 9/2003

FACILITY-WIDE EMISSIONS AFTER PROPOSED ACTION

Same emission factor references as in original PTC application (above)

80,000 pph Boiler, Operated at
Actual final stack height is 71.5 ft 80000 lbs/hr

	heat input:	8,750	BTU/Dry lb			
	Boiler Effic:	68.8%	*(Manufacturer's spec.)*			
	Fuel Value:	995	BTU for lb at *(Manufacturer's spec.)*			
	Calculated:	lbs steam/dry lb wood	8.79			
		lbs steam/BDT	17,579.46			
				For annual TAPs		
Calculation from	8,760	Operating hours/yr		57,943	BD tons burned over the year	
max steaming rate	17,579	lbs steam/hr from 1 BDT/hr	from G58	8,750	BTU value/ BD ton	
	57,943	BDT/yr at	80000	1,014,000,558,140	BTU consumed/yr	
			lbs steam	1,014,000,558	or M BTU/yr input	115685778.1
			average	1,014,001	or MM BTU/yr input	
PTE assumes continuous operation				115.8	ave. MMBTU/hr	
	calculations show emissions as per manufacturer's specs			115.8	ave. MMBTU/ oper hr	
	at	80000	lbs steam/hr annual average	80000	lbs steam/hr, ann ave steaming rate	
	24-hr max is equipment capacity, c	80000	lbs steam/hr			

PTE here conservatively assumes full capacity boiler operations except for HAPs. HAPs will be controlled by annual facility limit which will actually reduce emissions of all pollutants

Pollutant	EF	QTY	Units	lb/yr	tons/yr	oper. hours	boiler capacity Max lb/hr	avg lb/hr
CO	0.200	1,014,001	MMBTU input	202,800	101.40	8,760	23.15	23.15
PM	0.100	1,014,001	MMBTU input	101,400	50.70	8,760	11.58	11.58
PM10	0.040	1,014,001	MMBTU input	40,560	20.28	8,760	4.63	4.63
Condensibles	0.017	1,014,001	MMBTU input	17,238	8.62	8,760	1.97	1.97
VOC	0.050	1,014,001	MMBTU input	50,700	25.35	8,760	5.79	5.79
NOx	0.250	1,014,001	MMBTU input	253,500	126.75	8,760	28.94	28.94
SOx	0.235	1,014,001	MMBTU input	238,290	119.15	8,760	27.20	27.20
Pb	0.000	1,014,001	MMBTU input	48.7	0.02	8,760	0.0056	0.0056
					423.4	Total tons/yr (not double counting PM10 or codens)		

INCREASE IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

Pollutant	EF	QTY	Units	lb/yr	tons/yr	oper. hours	Max lb/hr	avg lb/hr
CO	0.200	515,251	MMBTU input	103,050	51.53	8,400	6.90	11.26
PM	0.100	515,251	MMBTU input	51,525	25.76	8,400	4.45	5.64
PM10	0.040	515,251	MMBTU input	20,610	10.31	8,400	1.78	2.26
Condensibles	0.017	515,251	MMBTU input	8,759	4.38	8,400	0.76	0.96
VOC	0.050	515,251	MMBTU input	25,763	12.88	8,400	2.23	2.82
NOx	0.250	515,251	MMBTU input	128,813	64.41	8,400	11.13	14.09
SOx	0.235	515,251	MMBTU input	121,084	60.54	8,400	10.45	13.25
Pb	0.000	515,251	MMBTU input	25	0.01	8,400	0.00	0.00
					216.1	Total tons/yr (not double counting PM10 or codens		

Same emission factor references as in original PTC application (above)

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PROCESS POINT EMISSIONS

JUNE 2005 PERMIT EMISSIONS

(all kilns assumed area sources)

PARTICULATE Process Name			PM EF	PM 10 EF	EF Units	Annual Oper (hours)	Max Thrput (mbf/hr) (120%)	Avg Thrput (mbf/hr)	Units	Thrput (annual)	Max PM Emiss (lbs/hr) (120%)	Avg PM Emiss (lbs/hr)	PM Emiss (tons/yr)	PM10 Emiss (tons/yr)	PM10 Emiss (lbs/hr)	Max PM10 Emiss (lb/hr)
Dry Kilns #1-5	P 18-21,28		0.33	0.19	lb/mbf	8,400	8.57	7.14	mbf/hr	60,000	2.83	2.36	9.90	5.70	1.36	1.63
										Total	2.8	2.4	9.9	5.7	1.4	1.6

VOC's Process Name		EF		EF Units	Annual Oper (hours)	Max Thrput (mbf/hr) (120%)	Avg Thrput (mbf/hr)	Units	Thrput (annual)	Max Emiss (lbs/hr) (120%)	Avg Emiss (lbs/hr)	VOC Emiss (tons/yr)	
Dry Kilns #1-4	P 18-21	1.5		lb/mbf	8,400	8.57	7.14	mbf/hr	60,000	12.86	10.71	45.0	"units = "mbf"

Ref: IDEQ EF's for the Wood Industry

HAPs Process Name		HAP	EF		EF Units	Annual Oper (hours)	Max Thrput (mbf/hr) (120%)	Avg Thrput (mbf/hr)	Units	Thrput (annual)	Max Emiss (lbs/hr) (120%)	Avg Emiss (lbs/hr)	HAP Emiss (tons/yr)	
Dry Kilns #1-5	P 18-21,28	Methanol	78.4		lb/MMbf	8,400	0.0086	0.0071	MMbf/yr	60	0.68	0.56	2.35	"units = "MMbf"
Dry Kilns #1-5	P 18-21,28	formaldehyde	2.186		lb/MMbf	8,400	0.0086	0.0071	MMbf/yr	60	0.02	0.02	0.07	"units = "MMbf"
Dry Kilns #1-5	P 18-21,28	acetaldehyde	7.5		lb/MMbf	8,400	0.0086	0.0071	MMbf/yr	60	0.07	0.05	0.22	
Dry Kilns #1-5	P 18-21,28	MIBK	1.3		lb/MMbf	8,400	0.0086	0.0071	MMbf/yr	60	0.01	0.01	0.04	
Dry Kilns #1-5	P 18-21,28	phenol	4		lb/MMbf	8,400	0.0086	0.0071	MMbf/yr	60	0.03	0.03	0.12	

HAP EFs: For each HAP, the max EF among the four wood species (fir, doug fir, lodgepole, P pine) anticipated to be processed, from Milota, 2001 & Oregon study, as used in original permit application. 2.80 TOTAL

FACILITY_WIDE EMISSIONS AFTER PROPOSED ACTION

Same emission factor references as in original PTC application [illegible]

PARTICULATE

[illegible]

Process Name		Meaning Code	PM EF	PM 10 EF	EF Units	Annual Oper (hours)	Max Thrput (hourly) (120%)	Avg Thrput (hourly)	Units	Thrput (annual)	Control Efficiency %	Max PM Emiss (lbs/hr) (120%)	Avg PM Emiss (lbs/hr)	PM Emiss (tons/yr)	PM10 Emiss (tons/yr)	Avg PM10 Emiss (lbs/hr)	120% Max PM10 Emiss (lb/hr)	Description of controls
Dry Kilns P1-5	P 18-21,28	KILNS	0.33	0.19	lb/mbf	8,400	35.71	29.76	mbf/hr	250,000	0%	11.78	9.82	41.25	23.75	5.65	6.79	None
Sawmill vent / outlet	P11			negligible; material balance accounts for all materials generated in sawmill elsewhere														
Defect Saw	P12	[illegible]	0.35	0.2	lb/ton	4,000	0.00330	0.00275	BDT	11	95%	0.0001	0.0000	0.0001	0.0001	0.0000	0.0000	[illegible]
Debarker	P13	[illegible]	0.024	0.011	lb/ton	4,000	100.00	85.65	BDT	340,000	98%	0.05	0.04	0.08	0.04	0.02	0.02	[illegible]
Merchandiser	P14	MERCHANDR	0.38	0.2	lb/ton	4,000	92.34	76.95	BDT	307,784	98%	0.65	0.54	1.08	0.62	0.31	0.37	[illegible]
Hog	P15			fully enclosed, [illegible], all emissions end up on outfeed conveyor, transfers to and from accounted for under TR 57, 60														
Planer vent / outfeed	P16			negligible; material balance accounts for all materials generated in planer elsewhere														
[illegible]	P17			emissions are quantified elsewhere														
Disc Screen	P22	DISCSCR	0.1	0.05	lb/ton	4,000	22.38	18.63	BDT	74,521	75%	0.56	0.47	0.93	0.47	0.23	0.28	[illegible]
Target Box	P24	TARGETBX	0.1	0.05	lb/ton	4,000	12.96	10.79	BDT	43,163	75%	0.32	0.27	0.54	0.27	0.13	0.16	[illegible]
										Total	[illegible]	13.4	11.1	43.9	25.1	6.3	7.6	

Emission factors from IDEQ EFs for Wood products Industry debarking, sawing (merchandiser, hog), target box for disc screen, target box

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											Total	[illegible]	1.6	1.3	2.6	1.4	0.7	0.8
																	0.3775	0.4524

VOC's

Process Name			EF		EF Units	Annual Oper (hours)	Max Thrput (hrly) (120%)	Avg Thrput (hourly)	Units	Thrput (annual)	Max Emiss (lbs/hr) (120%)	Avg Emiss (lbs/hr)	VOC Emiss (tons/yr)
Dry Kilns #1-5	P 18-21,2[illegible]		1.5		[illegible]	8,400	35.71	29.76	[illegible]	250,000	[illegible]	44.64	[illegible]

HAPs

Process Name		HAP	EF		EF Units	Annual Oper (hours)	Max Thrput (hrly) (120%)	Avg Thrput (hourly)	Units	Thrput (annual)	Max Emiss (lbs/hr) (120%)	Avg Emiss (lbs/hr)	HAP Emiss (tons/yr)
Dry Kilns #1-4	P 18-21	[illegible]	76.6		[illegible]	8,400	0.0357	0.0298	MMbf/yr	250	2.71	[illegible]	[illegible]
Dry Kilns #1-4	P 18-21	[illegible]	2.186		[illegible]	8,400	0.0357	0.0298	MMbf/yr	250	[illegible]	[illegible]	[illegible]
Dry Kilns #1-4	P 18-21	[illegible]	7.8		[illegible]	8,400	0.0357	0.0298	MMbf/yr	250	[illegible]	[illegible]	[illegible]
Dry Kilns #1-4	P 18-21	[illegible]	1.3		[illegible]	8,400	0.0357	0.0298	MMbf/yr	250	[illegible]	[illegible]	[illegible]
Dry Kilns #1-4	P 18-21	[illegible]	4		[illegible]	8,400	0.0357	0.0298	MMbf/yr	250	[illegible]	[illegible]	[illegible]

HAP EFs: [illegible]

11.75 TOTAL

HAP EFs by species

White Fir	122	lbs Methanol/MMbf	2.8	lbs Formaldehyde/MMbf	estimated % of timber	50%
Doug Fir	23	lbs Methanol/MMbf	1	lbs Formaldehyde/MMbf	estimated % of timber	35%
P Pine	65	lbs Methanol/MMbf	2.9	lbs Formaldehyde/MMbf	estimated % of timber	15%

INCREASE IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

Particulates

Same emission factor references as in original PTC application (above)

Process Name			PM EF	PM 10 EF	EF Units	Annual Oper (hours)	Max Thrput (hourly) (120%)	Avg Thrput (hourly)	Units	Thrput (annual)	Control Efficiency %	Max PM Emiss (lb/hr) (120%)	Avg PM Emiss (lb/hr)	PM Emiss (tons/yr)	PM10 Emiss (tons/yr)	Avg PM10 Emiss (lb/hr)	Max PM10 Emiss (lb/hr)	Description of Name
Dry Kilns #1-5	P 18-21,2[illegible]	KILNM										[illegible]	7.48	31.35	[illegible]	4.30	[illegible]	
[illegible] Saw	P12	[illegible]																[illegible]
Debarker	P13	DEBARKER										0.05	0.04	0.09	0.04	0.02	0.02	[illegible]
Merchandiser		MERCHDZR										0.65	0.54	1.08	0.82	0.31	0.37	[illegible]
Hog				negligible; material balance accounts for all materials generated in sawmill elsewhere														
Planer vent / outlet	P16			fully enclosed, including infeed and outfeed, so all emissions end up on outfeed conveyor														
[illegible] vent	P17			negligible; material balance accounts for all materials generated in planer elsewhere														
Disc Screen	P22	DISCSCR										0.56	0.47	0.93	0.47	0.23	0.28	[illegible]
Target Box	P24	TARGETBX										0.32	0.27	0.54	0.27	0.13	0.16	[illegible]
										Total	[illegible]	10.6	8.8	34.8	19.4	5.0	5.9	
										Total	[illegible]	1.6	1.3	2.6	1.4	0.7	0.8	

VOC's

Process Name		Modeling Code	EF		EF Units	Annual Oper (hours)	Max Thrput (hrly) (120%)	Avg Thrput (hourly)	Units	Thrput (annual)	Max Emiss (lbs/hr) (120%)	Avg Emiss (lbs/hr)	VOC Emiss (tons/yr)
Dry Kilns #1-5	P 18-21,2[illegible]	[illegible]	1.5		[illegible]	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HAPs

Process Name		HAP	EF		EF Units	Annual Oper (hours)	Max Thrput (hrly) (120%)	Avg Thrput (hourly)	Units	Thrput (annual)	Max Emiss (lbs/hr) (120%)	Avg Emiss (lbs/hr)	HAP Emiss (tons/yr)
Dry Kilns #1-5	P 18-21,2[illegible]	[illegible]	76.6		[illegible]	8,400	0.0271	0.0226	MMbf/yr	190	[illegible]	1.76	[illegible]
Dry Kilns #1-5	P 18-21,2[illegible]	[illegible]	2.186		[illegible]	8,400	0.0271	0.0226	MMbf/yr	190	[illegible]	[illegible]	[illegible]
Dry Kilns #1-5	P 18-21,2[illegible]	[illegible]	7.8		[illegible]	8,400	0.0271	0.0226	MMbf/yr	190	0.211716	0.1764	[illegible]
Dry Kilns #1-5	P 18-21,2[illegible]	[illegible]	1.3		[illegible]	8,400	0.0271	0.0226	MMbf/yr	190	[illegible]	[illegible]	[illegible]
Dry Kilns #1-5	P 18-21,2[illegible]	[illegible]	4		[illegible]	8,400	0.0271	0.0226	MMbf/yr	190	[illegible]	[illegible]	[illegible]

[illegible] TOTAL

HAP EFs: [illegible]

[illegible] 2006 | [illegible] .xls PR | [illegible]

TRANSFER/CONVEYOR CALCULATIONS

JUNE 2005 PERMIT [illegible] EMISSIONS

Conveyors

Name	Code				Wind Speed (MPH)	Moisture (%)	Max Trans Rate (BDT/hr)	Transfer Rate (BDT/hr)	Throughput (BDT tons/yr)	PM Emission Factor*		% control	Max TSP (lb/hr)	Avg. TSP (lb/hr)	TSP (tons/yr)	PM 10 (tons/yr)	Oper (hrs)
Covered Fuel Conveyor	TR 2				9.0	43	17.10	14.25	28,[illegible]	0.000[illegible]		1.00	NA	NA	NA	NA	2,000
Covered Distribution Conveyor	TR 3				9.0	43	17.10	14.25	24,[illegible]	0.000[illegible]		1.00	NA	NA	NA	NA	1,[illegible]
Covered Fuel Feed Conveyor	TR 4				9.0	43	8.14	8.70	11,400	0.000[illegible]		1.00	NA	NA	NA	NA	1,[illegible]
Fuel Feed conveyor	TR 5				9.0	43	8.14	6.71	28,500	0.000[illegible]		1.00	NA	NA	NA	NA	4,[illegible]
												Total	0.0	0.0	0.0	0.0	

* Use AP 42 13.2.4 Aggregate Handling

E=k(.0032)*(u/5)^1.3/(M/2)^1.4

particulate matter multiplier (k) = .35 for pm 10 — k=1 for PM

average wind speed = 9 mph

moisture content for fuel = 43%

Truck to Silo Transfers

Name	Code				Em. Factor (lb/ton)	Throughput (BDT)	Max Transfer Rate (BDT/hr)	Transfer Rate (BDT/hr)	Emissions (tons/yr)	Moisture Content		% control	Oper hours	Avg Em. (lb/hr)	Max Em. (lb/hr) (120%)
Truck Dump (& doghouse)	TR-1				2	[illegible]	30	25	7.13	0.43		0.75	2,[illegible]	7	9

Total 7.13 Tons/yr

Max [illegible] lb/hr (120%)

FACILITY_WIDE EMISSIONS AFTER PROPOSED ACTION

* Use AP 42 13.2.4 Aggregate Handling

E=k(.0032)*(u/5)^1.3/(M/2)^1.4

particulate matter multiplier (k) = .35 for pm 10 — k=1 for PM

average wind speed = 9 mph

moisture content for incoming logs estimated at 47%, 43% used in [illegible] calculations for conservatism

moisture content for [illegible] estimated at [illegible]%, [illegible]% used in [illegible] calculations for conservatism

at 47% moisture content — [illegible] = 0.0[illegible] lb/ton — [illegible] = 0.0[illegible] lb/ton

at [illegible]% moisture content — [illegible] = 0.0[illegible] lb/ton — [illegible] = 0.[illegible] lb/ton

Conveyors

[illegible]

[illegible]

[illegible]

Name	Code	Conveyors included	# drops	Moisture Content %	PM Em. Factor (lb/ton)	PM-10 Em. Factor (lb/ton)	Throughput (BDT)	Max Transfer Rate (BDT/hr)	Transfer Rate (BDT/hr)	PM Emissions (tons/yr)	PM-10 Emissions (tons/yr)	Moisture Content	Material Tracked	Emission Control Method	Emission Control %	Oper hours	PM Avg Em. (lb/hr)	PM Max Em. (lb/hr) (120%)	PM-10 Avg Em. (lb/hr)	PM-10 Max Em. (lb/hr) (120%)
Incoming log conveyors	Conf	[illegible]	6	47%	0.0[illegible]	0.0[illegible]	3[illegible]	1[illegible]	[illegible]	1.[illegible]	0.57	47%	[illegible]	[illegible]	[illegible]	4,[illegible]	[illegible]	0.[illegible]	0.[illegible]	0.[illegible]
[illegible]	Conf	[illegible]	2	47%	0.00[illegible]	0.0[illegible]	500	[illegible]	0.13	0.01	0.00	47%	[illegible]	[illegible]	[illegible]	4,[illegible]	[illegible]	0.01	0.00[illegible]	0.00[illegible]
									Total	1.6	0.6				0.0	1.0				

* Use AP 42 13.2.4 Aggregate Handling

E=k(.0032)*(u/5)^1.3/(M/2)^1.4

particulate matter multiplier (k) = .35 for pm 10 — k=1 for PM

average wind speed = 9 mph

moisture content for fuel = 47%

Transfers * Use AP 42 13.2.4 Aggregate Handling

E=k(.0032)*(u/5)^1.3/(M/2)^1.4

[illegible] — [illegible] — [illegible]

[illegible]

Name	Code	Transfer Point (s) included	# drops	Material	Moisture Content %	PM Em. Factor	PM-10 Em. Factor	Emission Control Methodology	Emission Control %	Oper hours	Throughput	Max Transfer Rate	Average Transfer Rate	PM Emissions	PM-10 Emissions	PM Avg Em	PM Max Em	PM-10 Avg Em.	PM-10 Max Em.
[illegible]		[illegible]																	
[illegible]	[illegible]	[illegible]	6	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	1.45	0.37	[illegible]	[illegible]	[illegible]	0.34
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	2,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]																	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	47%	[illegible]	[illegible]	[illegible]	50%	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	1000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.006
[illegible]	[illegible]	[illegible]	1	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]																	
[illegible]			[illegible]																
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	1.13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	2.76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]																	
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	[illegible]	75%	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]						[illegible]	100%										
[illegible]	[illegible]	[illegible]	2	[illegible]	47%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1	[illegible]	2%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	3	[illegible]	23%	[illegible]	[illegible]	[illegible]	75%	4,000	[illegible]	[illegible]	0.71	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]																	
[illegible]	[illegible]	[illegible]	3	[illegible]	19%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	0.17	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1	[illegible]	19%	[illegible]	[illegible]	[illegible]	75%	500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.11
[illegible]	[illegible]	[illegible]	2	[illegible]	19%	[illegible]	[illegible]	[illegible]	[illegible]	4,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.11	[illegible]

TRANSFER TOTALS [illegible] [illegible]

TRANSFER AND CONVEYOR TOTALS [illegible] [illegible]

[illegible] IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

[illegible]

PM [illegible]
PM-10 [illegible]

[illegible] [illegible] [illegible]

STORAGE SOURCE EMISSIONS

JUNE [illegible] EMISSIONS

Bins Name	Code	Thrput (tons/yr)	PM E. Fact (lb/ton)	PM10 E Fact (lb/ton)	% control	Units	Max Trans (tons/hr)	Avg Trans (tons/hr)	Operat. Hrs/yr	PM max (lbs/hr)	PM (tons/yr)	PM10 (tons/yr)	PM max (lbs/hr)
Storage Silo #1	ST 1	26,000	1	0.50	60%	[illegible]	30	25	2,000	6.6	3.0	1.7	4.6
Storage Silo #2	ST 2	26,000	1	0.50	60%	[illegible]	30	25	2,000	6.0	3.0	1.2	3.5
Enclosed ash hopper	ST 3	470	1	0.50	100%	[illegible]	NA	NA		NA	NA	NA	
									Total	12.0	6.0	2.9	7.8
										max (lbs/hr)	(tons/yr)	(tons/yr)	max (lbs/hr)

Ref: IDEQ EF's for the Wood Industry

FACILITY_WIDE EMISSIONS AFTER MODIFICATION

all emissions from all new storage bins, all truck bins and fuel silos are quantified under transfers, which include transfers into and out of all these storage units.

The storage units themselves are covered and sealed. Therefore, all new storage bins (except the ash bin) have all their emissions in this category

[illegible] Use AP-42 13.2.4 Aggregate Handling and Storage Piles

E=k(.0032)*(U/5)^1.3/(M/2)^1.4

[illegible] particulate matter multiplier (k) = .35 for pm 10

[illegible] average wind speed = 8 mph

at 47% moisture content [illegible] 0.0193 lb/ton [illegible] 0.0092 lb/ton

STORAGE BINS AND STORAGE

Name	ST #	Modeling Code	Thrput (tons/yr)	PM E. Fact (lb/ton)	PM10 E. Fact (lb/ton)	% control	Units	Max Trans (tons/hr)	Avg Trans (tons/hr)	Operat. Hrs/yr	PM max (lbs/hr)	PM (tons/yr)	PM10 (tons/yr)	PM-10 max (lbs/hr)	PM-10 ave (lbs/hr)
Fuel Silo #1	S 1		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
Fuel Silo #2	S 2		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
Sawmill Sawdust Truck Bin	S 11		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
Sawmill Chip Truck Bin	S 12		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
Bark Truck Bin	S 43		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
Enclosed ash hopper	S 44	STtph	667	1	0.50	75%	MIT	0.4	0.3	2,000	0.1	0.070	0.044	0.033	0.044
Green Lumber Storage Area	S 71		Negligible emissions from wet dimensional lumber, transfer and transporting vehicle emissions accounted for elsewhere												
Dry Lumber Storage Area	S 72		Negligible emissions from dried dimensional lumber, transfer and transporting vehicle emissions accounted for elsewhere												
Planer Truck Bin	S 73		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
Planer Chip Truck Bin	S 74		Enclosed container with no emissions, transfer emissions in and out accounted for under Transfers												
[illegible] Storage Area	S 75		Negligible emissions from dried dimensional lumber, transfer and transporting vehicle emissions accounted for elsewhere												
Yard waste pile	S 76	STyard	12,000	0.0092	0.0193	90%	MIT	34	25	4,000	0.2	0.6	0.0	0.088	0.045
Log Storage Area	S 77		Negligible emissions from watered log piles, transfer and transporting vehicle emissions and yard waste pile accounted for elsewhere												

Ref for Ash Storage emissions: IDEQ EF's for the Wood Industry, sawdust pile

	PM	PM	PM10	PM
Total	0.2	0.1	0.1	0.1

VOC emissions from the two diesel tanks (calculated using EPA TANKS 4.09)

10,500 gallon diesel tank	V1	combined breathing and working loss	3.47	lbs/yr	
15,000 gallon diesel tank	V1	combined breathing and working loss	5.10	lbs/yr	
Oil drums	V5	air emissions negligible			
		TOTAL VOC emissions from diesel tanks	8.57	lbs/yr	0.004 tons/yr

INCREASE IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

all emissions from all new storage bins are quantified under transfers, which include transfers into and out of all new storage units.

The storage units themselves are covered and sealed. Therefore, all new storage bins (except the ash bin) have all their emissions in this category

this results in a decrease in storage emissions. The previous emissions all still exist, they're just accounted for elsewhere

STORAGE BINS AND STORAGE		PM max (lbs/hr)	PM (tons/yr)	PM10 (tons/yr)	PM-10 max (lbs/hr)
Ref: IDEQ EF's for the Wood Industry, AP-42 13.2.4	Total	-11.8	-4.9	-2.8	-6.9

VOC emissions from the two diesel tanks (calculated using EPA TANKS 4.09)

10,500 gallon diesel tank	combined breathing and working loss	3.47	lbs/yr	
15,000 gallon diesel tank	combined breathing and working loss	5.10	lbs/yr	
TOTAL VOC emissions from diesel tanks		8.53	lbs/yr	0.004 tons/yr

3/24/2006 [illegible].xls ST Guy [illegible]

BOILER HAP / TAP EMISSIONS

Hr/year: 8,760

Pollutant	Emission Factor * (lb/MMBtu)	Current Permit Throughput	Proposed Throughput	Proposed Increase in Throughput	Units	JUNE 2005 PERMIT EMISSIONS: Max. 120% Emissions (lb/hr)	Avg. Emissions (lb/hr)	Emissions (tons/yr)	EPA HAP Emissions (tons/yr)	FACILITY-WIDE EMISSIONS AFTER PROPOSED ACTION: Max. 120% Emissions (lb/hr)	Avg. Emissions (lb/hr)	All HAP Emissions (tons/yr)	EPA HAP Emissions (tons/yr)	RESULT OF THE PROPOSED ACTION: Max. 120% Emissions (lb/hr)	Avg. Emissions (lb/hr)	Emissions (tons/yr)	EPA HAP Emissions (tons/yr)
[illegible]	9.1E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.3E-04		1.26E-04	1.05E-04	4.6E-04		6.42E-05	5.30E-05	2.3E-04	
[illegible]	5.0E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.2E-03		6.95E-04	5.79E-04	2.5E-03		3.53E-04	2.94E-04	1.3E-03	
[illegible]	8.3E-04	498,750	1,014,001	515,251	mm BTU	6.67E-02	4.73E-02	2.1E-01	2.1E-01	1.16E-01	9.61E-02	4.2E-01	4.2E-01	5.90E-02	4.88E-02	2.1E-01	2.1E-01
[illegible]	1.9E-04	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.7E-02		2.64E-02	2.20E-02	9.6E-02		1.34E-02	1.12E-02	4.9E-02	
[illegible]	3.2E-09	498,750	1,014,001	515,251	mm BTU	2.18E-07	1.82E-07	8.0E-07	8.0E-07	4.44E-07	3.70E-07	1.6E-06	1.6E-06	2.26E-07	1.88E-07	8.2E-07	8.2E-07
[illegible]	4.0E-03	498,750	1,014,001	515,251	mm BTU	2.73E-01	2.28E-01	1.0E+00	1.0E+00	5.56E-01	4.63E-01	2.0E+00	2.0E+00	2.82E-01	2.35E-01	1.0E+00	1.0E+00
[illegible]	3.0E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	7.5E-04		4.17E-04	3.47E-04	1.5E-03		2.12E-04	1.76E-04	7.7E-04	
[illegible]	8.5E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.1E-04		1.18E-04	9.84E-05	4.3E-04		6.02E-05	5.02E-05	2.2E-04	
[illegible]	4.2E-03	498,750	1,014,001	515,251	mm BTU	2.87E-01	2.39E-01	1.0E+00	1.0E+00	5.83E-01	4.86E-01	2.1E+00	2.1E+00	2.98E-01	2.47E-01	1.1E+00	1.1E+00
[illegible]	6.5E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.6E-06		9.03E-06	7.53E-06	3.3E-06		4.59E-06	3.83E-06	1.7E-06	
[illegible]	2.6E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.5E-04		3.61E-04	3.01E-04	1.3E-03		1.84E-04	1.53E-04	6.7E-04	
[illegible]	1.7E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.2E-05		2.36E-05	1.97E-05	8.6E-05		1.20E-05	1.00E-05	4.4E-05	
[illegible]	2.6E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.5E-07		3.61E-07	3.01E-07	1.3E-06		1.84E-07	1.53E-07	6.7E-07	
[illegible]	9.3E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.3E-06		1.29E-06	1.08E-06	4.7E-06		6.56E-07	5.47E-07	2.4E-06	
[illegible]	1.6E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.0E-05		2.22E-05	1.85E-05	8.1E-05		1.13E-05	9.41E-06	4.1E-05	
[illegible]	3.6E-08	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	9.0E-06		5.00E-06	4.17E-06	1.8E-05		2.54E-06	2.12E-06	9.3E-06	
[illegible]	4.7E-08	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.2E-05		6.53E-06	5.44E-06	2.4E-05		3.32E-06	2.76E-06	1.2E-05	
[illegible]	4.7E-08	498,750	1,014,001	515,251	mm BTU	3.21E-06	2.68E-06	1.2E-05	1.2E-05	6.53E-06	5.44E-06	2.4E-05	2.4E-05	3.32E-06	2.76E-06	1.2E-05	1.2E-05
[illegible]	1.5E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	3.7E-03		2.08E-03	1.74E-03	7.6E-03		1.06E-03	8.82E-04	3.9E-03	
[illegible]	5.4E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.3E-03		7.50E-04	6.25E-04	2.7E-03		3.81E-04	3.18E-04	1.4E-03	
[illegible]	1.8E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.5E-04		2.50E-04	2.08E-04	9.1E-04		1.27E-04	1.06E-04	4.6E-04	
[illegible]	4.5E-05	498,750	1,014,001	515,251	mm BTU	3.07E-03	2.56E-03	1.1E-02	1.1E-02	6.25E-03	5.21E-03	2.3E-02	2.3E-02	3.18E-03	2.65E-03	1.2E-02	1.2E-02
[illegible]	7.9E-04	498,750	1,014,001	515,251	mm BTU	5.40E-02	4.50E-02	2.0E-01	2.0E-01	1.10E-01	9.14E-02	4.0E-01	4.0E-01	5.58E-02	4.65E-02	2.0E-01	2.0E-01
[illegible]	3.3E-05	498,750	1,014,001	515,251	mm BTU	2.25E-03	1.88E-03	8.2E-03	8.2E-03	4.58E-03	3.82E-03	1.7E-02	1.7E-02	2.33E-03	1.94E-03	8.5E-03	8.5E-03
[illegible]	2.8E-05	498,750	1,014,001	515,251	mm BTU	1.91E-03	1.59E-03	7.0E-03	7.0E-03	3.89E-03	3.24E-03	1.4E-02	1.4E-02	1.98E-03	1.65E-03	7.2E-03	7.2E-03
[illegible]	2.2E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	5.7E-03		3.19E-03	2.66E-03	1.2E-02		1.62E-03	1.35E-03	5.9E-03	
[illegible]	2.4E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.0E-07		3.33E-07	2.78E-07	1.2E-06		1.69E-07	1.41E-07	6.2E-07	
[illegible]	2.4E-08	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.0E-06		3.33E-06	2.78E-06	1.2E-05		1.69E-06	1.41E-06	6.2E-06	
[illegible]	3.0E-08	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	8.5E-06		5.29E-06	4.40E-06	1.9E-05		2.69E-06	2.24E-06	9.8E-06	
[illegible]	9.0E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.3E-03		1.25E-03	1.10E-03	5.0E-03		6.35E-04	5.29E-04	2.3E-03	
[illegible]	2.7E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.7E-08		3.75E-08	3.13E-08	1.4E-07		1.91E-08	1.59E-08	7.0E-08	
[illegible]	9.1E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.3E-06		1.26E-06	1.05E-06	4.6E-06		6.42E-07	5.35E-07	2.3E-06	
[illegible]	5.5E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.4E-02		7.64E-03	6.37E-03	2.8E-02		3.89E-03	3.24E-03	1.4E-02	
[illegible]	7.4E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.8E-07		1.03E-07	8.57E-08	3.8E-07		5.22E-08	4.35E-08	1.9E-07	
[illegible]	2.9E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	7.2E-03		4.00E-03	3.33E-03	1.5E-02		2.04E-03	1.71E-03	7.5E-03	
[illegible]	2.9E-04	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	7.2E-02		4.03E-02	3.36E-02	1.5E-01		2.05E-02	1.71E-02	7.5E-02	
[illegible]	3.3E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	8.2E-03		4.58E-03	3.82E-03	1.7E-02		2.33E-03	1.94E-03	8.5E-03	
[illegible]	1.8E-07	498,750	1,014,001	515,251	mm BTU	1.23E-05	1.02E-05	4.5E-05	4.5E-05	2.50E-05	2.08E-05	9.1E-05	9.1E-05	1.27E-05	1.06E-05	4.6E-05	4.6E-05
[illegible]	3.1E-05	498,750	1,014,001	515,251	mm BTU	2.12E-03	1.76E-03	7.7E-03	7.7E-03	4.31E-03	3.59E-03	1.6E-02	1.6E-02	2.19E-03	1.83E-03	8.0E-03	8.0E-03
[illegible]	1.6E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.0E-04		2.22E-04	1.85E-04	8.1E-04		1.13E-04	9.41E-05	4.1E-04	
[illegible]	3.4E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	8.5E-04		4.72E-04	3.94E-04	1.7E-03		2.40E-04	2.00E-04	8.8E-04	
[illegible]	4.4E-03	498,750	1,014,001	515,251	mm BTU	3.01E-01	2.51E-01	1.1E+00	1.1E+00	6.11E-01	5.09E-01	2.2E+00	2.2E+00	3.11E-01	2.59E-01	1.1E+00	1.1E+00
[illegible]	6.6E-11	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.6E-08		9.17E-09	7.64E-09	3.3E-08		4.66E-09	3.89E-09	1.7E-08	
[illegible]	5.5E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.4E-07		7.64E-08	6.37E-08	2.8E-07		3.89E-08	3.24E-08	1.4E-07	
[illegible]	7.0E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.7E-03		9.72E-04	8.10E-04	3.5E-03		4.94E-04	4.12E-04	1.8E-03	
[illegible]	2.0E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	5.0E-07		2.78E-07	2.32E-07	1.0E-06		1.41E-07	1.18E-07	5.2E-07	
[illegible]	2.4E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.0E-08		3.33E-08	2.78E-08	1.2E-07		1.69E-08	1.41E-08	6.2E-08	
[illegible]	1.6E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.0E-04		2.22E-04	1.85E-04	8.1E-04		1.13E-04	9.41E-05	4.1E-04	

[illegible]	2.0E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	7.0E-08		3.88E-08	3.24E-08	1.4E-07		1.98E-08	1.65E-08	7.2E-08	
[illegible]	1.9E-02	498,750	1,014,001	515,251	mm BTU	1.20E+00	1.00E+00	4.7E+00	4.7E+00	2.84E+00	2.20E+00	9.63E+00	9.6E+00	1.36E+00	1.13E+00	4.9E+00	4.9E+00
[illegible]	8.7E-08	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.2E-06		1.21E-05	1.01E-05	4.4E-05		6.14E-06	5.12E-06	2.2E-05	
[illegible]	1.2E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	3.0E-03		1.67E-03	1.39E-03	6.1E-03		8.47E-04	7.06E-04	3.1E-03	
[illegible]	1.2E-02	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	3.0E+00		1.47E+00	1.23E+00	6.1E+00		8.47E-01	7.06E-01	3.1E+00	
[illegible]	1.8E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	4.0E-06		3.22E-06	1.86E-06	8.1E-06		1.12E-06	9.41E-07	4.1E-06	
[illegible]	2.2E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.8E-09		3.88E-09	2.88E-09	1.1E-07		1.48E-09	1.23E-09	5.7E-09	
[illegible]	9.7E-05	498,750	1,014,001	515,251	mm BTU	6.63E-05	5.52E-05	2.4E-02	2.4E-02	1.38E-02	1.12E-02	4.8E-02	4.8E-02	6.86E-03	5.71E-03	2.5E-02	2.5E-02
[illegible]	2.4E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.8E-06		3.33E-06	2.78E-06	1.2E-05		1.69E-06	1.41E-06	6.3E-06	
[illegible]	2.4E-07	498,750	1,014,001	515,251	mm BTU	1.64E-05	1.37E-05	6.0E-05	6.0E-05	3.33E-05	2.78E-05	1.2E-04	1.2E-04	1.69E-05	1.41E-05	6.3E-05	6.3E-05
[illegible]	6.6E-08	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.8E-08		9.17E-08	7.64E-08	3.3E-08		4.66E-08	3.88E-08	1.7E-08	
[illegible]	8.8E-11	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.2E-08		1.22E-08	1.02E-08	4.5E-08		6.21E-09	5.18E-09	2.3E-08	
[illegible]	1.1E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	3.7E-07		2.08E-07	1.74E-07	7.8E-07		1.06E-07	8.82E-08	3.9E-07	
[illegible]	4.2E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.0E-07		5.83E-08	4.86E-08	2.1E-07		2.96E-08	2.47E-08	1.1E-07	
[illegible]	1.2E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	3.0E-07		1.67E-07	1.39E-07	6.1E-07		8.47E-08	7.06E-08	3.1E-07	
[illegible]	5.1E-07	498,750	1,014,001	515,251	mm BTU	3.48E-06	2.90E-06	1.3E-05	1.3E-05	7.08E-06	5.90E-06	2.6E-05	2.6E-05	3.59E-06	3.00E-06	1.3E-05	1.3E-05
[illegible]	5.2E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.3E-07		7.22E-08	6.02E-08	2.6E-07		3.67E-08	3.06E-08	1.3E-07	
[illegible]	3.6E-07	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	8.8E-05		4.72E-05	3.94E-05	1.7E-04		2.40E-05	2.00E-05	8.8E-05	
[illegible]	7.0E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.7E-03		9.72E-04	8.10E-04	3.6E-03		4.94E-04	4.12E-04	1.8E-03	
[illegible]	5.1E-06	498,750	1,014,001	515,251	mm BTU	3.48E-03	2.90E-03	1.3E-02	1.3E-02	7.08E-03	5.90E-03	2.6E-02	2.6E-02	3.60E-03	3.00E-03	1.3E-02	1.3E-02
[illegible]	3.2E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	8.0E-04		4.44E-04	3.70E-04	1.6E-03		2.26E-04	1.88E-04	8.2E-04	
[illegible]	6.1E-06	498,750	1,014,001	515,251	mm BTU	4.17E-03	3.47E-03	1.5E-02	1.5E-02	8.47E-03	7.06E-03	3.1E-02	3.1E-02	4.31E-03	3.59E-03	1.6E-02	1.6E-02
[illegible]	3.7E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	9.2E-04		5.14E-04	4.28E-04	1.9E-03		2.61E-04	2.18E-04	9.5E-04	
[illegible]	1.9E-03	498,750	1,014,001	515,251	mm BTU	1.30E-01	1.08E-01	4.7E-01	4.7E-01	2.64E-01	2.20E-01	9.6E-01	9.6E-01	1.34E-01	1.12E-01	4.9E-01	4.9E-01
[illegible]	8.6E-12	498,750	1,014,001	515,251	mm BTU	5.88E-10	4.80E-10	2.1E-09	2.1E-09	1.19E-09	9.95E-10	4.4E-09	4.4E-09	6.07E-10	5.06E-10	2.2E-09	2.2E-09
[illegible]	4.7E-18	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.2E-07		6.53E-09	5.44E-09	2.4E-07		3.32E-09	2.77E-09	1.2E-07	
[illegible]	9.0E-11	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.2E-08		1.25E-08	1.04E-08	4.6E-08		6.36E-09	5.30E-09	2.3E-08	
[illegible]	7.5E-10	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.9E-07		1.04E-07	8.68E-08	3.8E-07		5.29E-08	4.41E-08	1.9E-07	
[illegible]	2.5E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.2E-07		3.47E-07	2.89E-07	1.3E-06		1.76E-07	1.47E-07	6.4E-07	
[illegible]	3.8E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	9.5E-03		6.28E-03	4.40E-03	1.9E-02		2.69E-03	2.24E-03	9.8E-03	
[illegible]	7.2E-06	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.8E-03		1.00E-03	8.33E-04	3.7E-03		5.09E-04	4.23E-04	1.8E-03	
[illegible]	1.1E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	2.7E-03		1.53E-03	1.27E-03	5.6E-03		7.78E-04	6.47E-04	2.8E-03	
[illegible]	8.2E-04	498,750	1,014,001	515,251	mm BTU	4.20E-02	3.24E-02	2.3E-01	2.3E-01	1.20E-01	1.00E-01	4.7E-01	4.7E-01	6.48E-02	5.41E-02	2.4E-01	2.4E-01
[illegible]	2.6E-09	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	6.5E-07		3.61E-07	3.01E-07	1.3E-06		1.84E-07	1.53E-07	6.7E-07	
[illegible]	3.1E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	7.7E-03		4.31E-03	3.59E-03	1.6E-02		2.19E-03	1.83E-03	8.0E-03	
[illegible]	3.0E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	7.6E-03		4.17E-03	3.47E-03	1.5E-02		2.12E-03	1.76E-03	7.7E-03	
[illegible]	4.1E-05	498,750	1,014,001	515,251	mm BTU	0.00E+00	0.00E+00	1.0E-02		5.70E-03	4.75E-03	2.1E-02		2.90E-03	2.41E-03	1.1E-02	
[illegible]	2.2E-08	498,750	1,014,001	515,251	mm BTU	1.60E-06	1.25E-05	5.5E-06	5.5E-06	3.06E-06	2.55E-06	1.1E-05	1.1E-05	1.55E-06	1.30E-06	5.7E-06	5.7E-06
[illegible]	1.8E-05	498,750	1,014,001	515,251	mm BTU	1.22E-03	1.02E-03	4.5E-03	4.5E-03	2.50E-03	2.08E-03	9.1E-03	9.1E-03	1.27E-03	1.06E-03	4.6E-03	4.6E-03
[illegible]	2.5E-05	498,750	1,014,001	515,251	mm BTU	1.71E-03	1.42E-03	6.2E-03	6.2E-03	3.47E-03	2.89E-03	1.3E-02	1.3E-02	1.76E-03	1.47E-03	6.4E-03	6.4E-03
[illegible]	7.9E-06	498,750	1,014,001	515,251	mm BTU	5.40E-04	4.50E-04	2.0E-03	2.0E-03	1.10E-03	9.14E-04	4.0E-03	4.0E-03	5.59E-04	4.66E-04	2.0E-03	2.0E-03
[illegible]	2.2E-05	498,750	1,014,001	515,251	mm BTU	1.50E-03	1.25E-03	5.5E-03	5.5E-03	3.06E-03	2.54E-03	1.1E-02	1.1E-02	1.55E-03	1.29E-03	5.7E-03	5.7E-03
[illegible]	1.1E-06	498,750	1,014,001	515,251	mm BTU	7.52E-05	6.26E-05	2.7E-04	2.7E-04	1.53E-04	1.27E-04	5.6E-04	5.6E-04	7.78E-05	6.47E-05	2.8E-04	2.8E-04
[illegible]	4.1E-06	498,750	1,014,001	515,251	mm BTU	2.80E-04	2.33E-04	1.0E-03	1.0E-03	5.70E-04	4.75E-04	2.1E-03	2.1E-03	2.90E-04	2.41E-04	1.1E-03	1.1E-03
[illegible]	2.1E-05	498,750	1,014,001	515,251	mm BTU	1.43E-03	1.20E-03	5.2E-03	5.2E-03	2.92E-03	2.43E-03	1.1E-02	1.1E-02	1.48E-03	1.24E-03	5.4E-03	5.4E-03
[illegible]	6.5E-06	498,750	1,014,001	515,251	mm BTU	4.44E-04	3.70E-04	1.6E-03	1.6E-03	9.03E-04	7.52E-04	3.3E-03	3.3E-03	4.59E-04	3.83E-04	1.7E-03	1.7E-03
[illegible]	4.8E-05	498,750	1,014,001	515,251	mm BTU	3.28E-03	2.73E-03	1.2E-02	1.2E-02	6.67E-03	5.56E-03	2.4E-02	2.4E-02	3.39E-03	2.83E-03	1.2E-02	1.2E-02
[illegible]	1.6E-03	498,750	1,014,001	515,251	mm BTU	1.09E-01	9.11E-02	4.0E-01	4.0E-01	2.22E-01	1.85E-01	8.1E-01	8.1E-01	1.13E-01	9.41E-02	4.1E-01	4.1E-01
[illegible]	3.5E-06	498,750	1,014,001	515,251	mm BTU	2.39E-04	1.99E-04	8.7E-04	8.7E-04	4.86E-04	4.05E-04	1.8E-03	1.8E-03	2.47E-04	2.06E-04	9.0E-04	9.0E-04
[illegible]	3.3E-05	498,750	1,014,001	515,251	mm BTU	2.26E-03	1.88E-03	8.2E-03	8.2E-03	4.58E-03	3.82E-03	1.7E-02	1.7E-02	2.33E-03	1.94E-03	8.5E-03	8.5E-03
[illegible]	2.8E-06	498,750	1,014,001	515,251	mm BTU	1.91E-04	1.59E-04	7.0E-04	7.0E-04	3.89E-04	3.24E-04	1.4E-03	1.4E-03	1.98E-04	1.65E-04	7.2E-04	7.2E-04
					Total	2.51E+00	2.17E+00	12.730	9.521	7.66E+00	6.31E+00	[illegible]	[illegible]	[illegible]	[illegible]	13.189	[illegible]

* From AP-42 Table 1.6-3 updated Sept 2003

[illegible] [illegible] [illegible]

STACK EMISSIONS (other than boiler)

JUNE 2005 PERMIT EMISSIONS

none

FACILITY-WIDE EMISSIONS AFTER PROPOSED ACTION
INCREASE IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

PM10

Process Name		PM Em. Factor	PM-10 Em. Factor	EF Units	Operating (hours)	Avg Throughput (hourly)	Units	Throughput (annual)	Units	PM Annual Emissions (tons/yr)	PM Ave hrly Emissions (lbs/hr)	PM 120% Max hrly Emissions (lbs/hr)	PM-10 Annual Emissions (tons/yr)	PM-10 Ave hrly Emissions (lbs/hr)	PM-10 120% Max hrly Emissions (lbs/hr)
Sawmill		0.35	0.2	lbs/ton	4,000	30.00	MBF Log S/hr	120,000	MBF Log S/yr	All emissions through P11, C11, C12					
Saw Dust Collection system w/o bin	CY11	0.04	0.04	lbs/BDT	4,000	0.5	BDT/hr	2,000	BDT/yr	0.04	0.02	0.02	0.04	0.02	0.02
Mill sawdust sys discharge to bin	CY12	0.2	0.16	lbs/BDT	4,000	3.22	BDT/hr	12,878	BDT/yr	1.29	0.64	0.77	1.03	0.52	0.62
Filing Rm Dust System discharge	CY41	2	1.6	lbs/BDT	4,000	0.00075	BDT/hr	3	BDT/yr	0.00300	0.00150	0.00180	0.00240	0.00120	0.00144
Planer Chip Truck bin cyclone	CY71	0.5	0.25	lbs/BDT	4,000	1.97	BDT/hr	7,884	BDT/yr	1.97	0.99	1.18	0.99	0.49	0.59
Planer cyclone with baghouse	CY72	0.04	0.04	lbs/BDT	4,000	5.60	BDT/hr	22,403	BDT/yr	0.45	0.22	0.27	0.45	0.22	0.27
Shaving Planer Truck bin cyclone	CY73	0.5	0.25	lbs/BDT	4,000	5.60	BDT/hr	22,403	BDT/yr	5.60	2.80	3.36	2.80	1.40	1.68
[illegible] (CY73 [illegible])	CY73A		alternative operating scenario for CY73 only under upset, same emission profile, emissions on CY 73 set to max either way so emissions accounted for under CY73												
Shavings system [illegible] bldg	CY74	0.2	0.16	lbs/BDT	4,000	5.60	BDT/hr	22,403	BDT/yr		discharges into bldg (subsequent venting releases from P17)				
								Total Emissions		9.4			5.5		

Emission factor references: From IDEQ Emission Factor Guide for the Wood Products Industry

Sawmill sawing logs

Cyclones CY72 sanderdust w/ bh, CY71, CY73 dry and green chips, CY12, CY74 high eff. Shavings, CY11 shavings, sawdust w/ bh, CY41 sanderdust

FUGITIVE ROAD EMISSIONS

[redacted]

\# of rain days/year? 156

Static Information (all vehicles)

Vehicle Type	ID Number	No. of Wheels	Paved or Unpaved?	Avg Weight (tons)	VMT traveled (miles/yr)
Lumber Truck	LT	26	paved	37.8	1,853
Fuel Truck	FT	26	paved	27.5	1,515
Fork Lift	TY	6	paved	16.8	1,802
Fork Lift	YK	6	paved	16.0	2,846
Fork Lift	KY	6	paved	15.3	2,130
Fork Lift	YP	6	paved	15.3	2,130
Passenger Cars	PC	4	paved	3.0	2,500

Paved Travel

* AP42 13.2.1.3 equ 1 (updated 12/03)

PM E = (.082 x (sL/2)^0.65) x ((W/3)^1.5) -(.00047)

PM10 E = (.016 x (sL/2)^0.65) x ((W/3)^1.5) -(.00047)

Assumed solid waste landfill SL mean factor of 7.4 g/m^2 Table 13.2.1-4

Vehicle Type	ID Number	W Avg. Wt. (tons)	sL Silt Load Load	E PM (lb/VMT)	E PM 10 (lb/VMT)		VMT	Emissions PM (tons/yr)	Emissions PM 10 (tons/yr)
Lumber Truck	LT	37.8	7.4	8.57	1.67		1,853	7.09	1.38
Fuel Truck	FT	27.5	7.4	5.33	1.04		1,515	4.03	0.79
Fork Lift	TY	16.8	7.4	2.53	0.49		1,802	2.03	0.40
Fork Lift	YK	16.0	7.4	2.37	0.46		2,846	3.38	0.66
Fork Lift	KY	15.3	7.4	2.20	0.43		2,130	2.35	0.46
Fork Lift	YP	15.3	7.4	2.20	0.43		2,130	2.35	0.46
Passenger Cars	PC	3.0	7.4	0.19	0.04		2,500	0.24	0.05
							Total tons/yr	21.48	4.18

Assumed SL most similar to solid waste landfill mean factor of 7.4 g/m^2 Table 13.2.1-4
Only E and k need to have the same "units".

FACILITY-WIDE EMISSIONS AFTER PROPOSED ACTION

plus AP-42 13.2.2 equation (1a), updated 12/03, for unpaved road traffic on an industrial site with precip reduction from AP-42 13.2.2 equ 2

Unpaved Travel

PM E = (4.9 x (s/12)^0.7 (W/3)^0.45) x (365-P)/365

PM10 E = (1.5 x (s/12)^0.9 (W/3)^0.45) x (365-P)/365

where P = # days with measurable precipitation per yea 156 for Grangeville

Roads will be watered daily, whenever dust is visible.
50% control efficiency is applied

Same emission factor references as in original PTC application (above)

Assumed solid waste landfill SL mean factor of 7.4 g/m^2 Table 13.2.1-4

Vehicle Type	Load	W Avg. Wt. (tons)	sL Silt Load Load	E PM (lb/VMT)	E PM 10 (lb/VMT)	VMT (miles/day)	Days/yr	Uncontrolled PM Emissions (tons/yr)	Uncontrolled PM 10 Emissions (tons/yr)	Controlled PM Emissions (tons/yr)	Controlled PM 10 Emissions (tons/yr)
LOG YARD											
[illegible]	empty	37.78	7.4	6.26	3.03	0.726	260	6.82	3.31	3.41	1.66
[illegible]	full	47.43	7.4	6.93	3.36	0.726	260	7.56	3.67	3.78	1.83
[illegible]	empty	37.78	7.4	6.26	3.03	0.726	260	6.82	3.31	3.41	1.66
[illegible]	full	47.43	7.4	6.93	3.36	0.726	260	7.56	3.67	3.78	1.83
[illegible]	empty	52.5	7.4	7.26	3.52	4.00	260	3.63	1.76	1.81	0.88
[illegible]	full	81.5	7.4	8.84	4.29	4.00	260	4.42	2.14	2.21	1.07
[illegible]	empty	52.5	7.4	7.26	3.52	4.00	260	3.63	1.76	1.81	0.88
[illegible]	full	81.5	7.4	8.84	4.29	4.00	260	4.42	2.14	2.21	1.07
[illegible]	empty	42.0	7.4	6.56	3.18	0.30	260	0.26	0.12	0.13	0.06
[illegible]	full	43.0	7.4	6.63	3.22	0.00	260	0.00	0.00	0.00	0.00
[illegible]	empty	43.0	7.4	6.63	3.22	0.30	260	0.26	0.12	0.13	0.06
[illegible]	full	44.0	7.4	6.70	3.25	0.00	260	0.00	0.00	0.00	0.00
[illegible]	empty	35.8	7.4	6.38	3.10	2.91	260	2.32	1.13	1.16	0.56
[illegible]	full	46.75	7.4	6.88	3.34	2.91	260	2.58	1.22	1.29	0.61

[illegible]	empty	12.0	7.4	3.73	1.81	2.50	75	0.36	0.17	0.17	0.08
[illegible]	full	22.0	7.4	4.90	2.38	2.50	75	0.46	0.22	0.23	0.11
[illegible]	empty	14.0	7.4	4.00	1.94	5.46	250	2.73	1.33	1.37	0.66
[illegible]	full	43.0	7.4	6.63	3.22	5.46	250	4.52	2.20	2.26	1.10
SAWMILL											
[illegible]	full	21.5	7.4	4.86	2.36	3.03	250	1.84	0.89	0.92	0.45
[illegible]	empty	9.0	7.4	3.29	1.59	3.03	250	1.24	0.60	0.62	0.30
							Total tons/yr	61.31	29.78	30.66	14.88

Paved Travel

* AP42 13.2.1.3 equ 1 (updated 12/03) with precip reduction from AP-42 13.2.1.3 equ 2

as per previous IDEQ approved permit emission inventory

PM E = (.082 x (sL/2)^0.65) x ((W/3)^1.5) -(.00047) x (1-P/(4*365))

PM10 E =((.016 x (sL/2)^0.65) x ((W/3)^1.5) -(.00047)) x (1-P/(4*365))

where P = # days with measurable precipitation per year : 156 for Grangeville

Assumed solid waste landfill SL mean factor of 7.4 g/m^2 Table 13.2.1-4

This equation will overpredict paved road emissions because it assumes vehicle speeds of 10 - 35 mph while actual speeds will average 5 mph or less

BFI owns a road sweeper, will sweep after snowmelt and whenever dust of dirt on road is visible during the dry season

50% controls applied on paved road particulate emissions

Vehicle Type	Load	Control Eff. (%)	W Avg. Wt. (tons)	sL Silt Load Load	E PM (lb/VMT)	E PM 10 (lb/VMT)	Days/yr	VMT per day	Emissions PM (tons/yr)	Emissions PM 10 (tons/yr)
LOG YARD										
Incoming Log Truck	full	50	29.8	7.4	2.58	0.50	250	25.46	8.1976	1.5990
Outgoing Log Truck	empty	50	29.0	7.4	2.58	0.50	250	25.46	8.1976	1.5990
SAWMILL										
[illegible]	empty	50	21.0	7.4	1.59	0.31	250	9.87	1.9562	0.3818
[illegible]	full	50	28.0	7.4	2.44	0.48	250	9.87	3.0180	0.5881
[illegible]	empty	50	14.0	7.4	1.28	0.25	250	4.22	0.6644	0.1295
[illegible]	full	50	48.0	7.4	5.66	1.10	250	4.22	2.8844	0.5822
[illegible]	empty	50	18.0	7.4	1.26	0.25	250	1.61	0.2530	0.0494
[illegible]	full	50	48.0	7.4	5.66	1.10	250	1.61	1.1386	0.2221
[illegible]	empty	50	18.0	7.4	1.28	0.25	250	0.78	0.1228	0.0238
[illegible]	full	50	48.0	7.4	5.66	1.10	250	0.78	0.5618	0.1076
Millwright Pickup	empty	50	3.0	7.4	0.09	0.02	250	1.00	0.0107	0.0021
Millwright Pickup	full	50	3.0	7.4	0.09	0.02	250	1.00	0.0107	0.0021
Mechanic Pickup	empty	50	4.0	7.4	0.13	0.03	250	1.00	0.0165	0.0032
Mechanic Pickup	full	50	4.0	7.4	0.13	0.03	250	1.00	0.0165	0.0032
Fuel Delivery Truck	full	50	42.0	7.4	4.48	0.88	250	0.06	0.0255	0.0050
Fuel delivery truck	empty	50	16.0	7.4	1.08	0.21	250	0.06	0.0060	0.0012
KILNS										
[illegible]	empty	50	21.0	7.4	1.59	0.31	250	2.88	0.5873	0.1145
[illegible]	full	50	27.3	7.4	2.38	0.46	250	2.88	0.8705	0.1696
BOILER										
Ash Trucks	empty	50	9.0	7.4	0.46	0.09	250	0.06	0.0048	0.0009
Ash Trucks	full	50	21.5	7.4	1.64	0.32	250	0.06	0.0184	0.0038
PLANER										
[illegible]	empty	50	21.0	7.4	1.59	0.31	250	1.32	0.2619	0.0511
[illegible]	full	50	27.3	7.4	2.35	0.46	250	1.32	0.3882	0.0757
[illegible]	empty	50	14.63	7.4	0.92	0.18	250	27.74	3.1996	0.6238
[illegible]	full	50	17.33	7.4	1.19	0.23	250	27.74	4.1257	0.8044
[illegible]	full	50	49.00	7.4	5.66	1.10	250	0.48	0.3386	0.0662
[illegible]	empty	50	18.00	7.4	1.26	0.25	250	0.48	0.0756	0.0147
SHIPPING										
Outbound Trucks	full	50	45.0	7.4	4.98	0.97	250	2.60	1.6182	0.3157
Inbound Trucks	empty	50	16.0	7.4	1.08	0.21	250	2.60	0.3430	0.0669
[illegible]	empty	50	14.63	7.4	0.92	0.18	250	11.10	1.2804	0.2496
[illegible]	full	50	17.33	7.4	1.19	0.23	250	11.10	1.6508	0.3219
ROSEBUD										
[illegible]	empty	50	5.0	7.4	0.19	0.04	250	0.12	0.0029	0.0006
[illegible]	full	50	8.8	7.4	0.27	0.05	250	0.12	0.0041	0.0008
[illegible]	full	50	16.0	7.4	1.08	0.21	250	0.79	0.1042	0.0203
[illegible]	empty	50	40.8	7.4	4.17	0.81	250	0.79	0.4121	0.0804
[illegible]	full	50	18.0	7.4	1.28	0.25	250	0.92	0.1446	0.0282
[illegible]	empty	50	49.0	7.4	5.66	1.10	250	0.92	0.6506	0.1269

Paved Road tons/yr 43.25 8.44

All roads Total tons/yr 73.9 23.3

INCREASE IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

calculated as difference between current permit total and post modification total

	tons/yr
PM	82.4
PM-10	18.1

Same emission factor references as in original PTC application (above)

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FACILITY-WIDE EMISSIONS TOTALS

JUNE, 2005 PERMIT EMISSIONS

	Source	Condensibles (tons/yr)	PM 10 (tons/yr)	Particulate (tons/yr)	VOC's (tons/yr)	SO 2 (tons/yr)	CO (tons/yr)	NOx (tons/yr)	Lead (tons/yr)	HAPs (tons/yr)	Totals (w/o PM10)
Point	Boiler	4.24	9.88	24.94	12.47	58.60	49.86	62.34	0.012	9.62	217.76
Point	Process - point	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	subtotal	4.24	9.88	24.94	12.47	58.60	49.86	62.34	0.01	9.62	217.76
Fugitive	Process - fugitive (kilns)	NA	5.70	9.90	46.00	NA	NA	NA	NA	2.62	67.72
Fugitive	Transfer - Conveyors	NA	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00
Fugitive	Transfer - Trucks	NA	0.00	7.13	NA	NA	NA	NA	NA	NA	7.13
Fugitive	Storage - Bins	NA	2.90	5.00	NA	NA	NA	NA	NA	NA	5.00
Fugitive	Vehicle Traffic	NA	4.16	21.46	NA	NA	NA	NA	NA	NA	21.46
	subtotal	0.00	12.76	43.49	46.00	0.00	0.00	0.00	0.00	2.62	91.30
	Total	4.2	22.8	68.4	57.5	58.6	49.9	62.3	0.01	12.3	309.1

FACILITY-WIDE EMISSIONS AFTER PROPOSED ACTION

Same emission factor references as in original PTC application (above)

	Source	Condensibles (tons/yr)	PM 10 (tons/yr)	Particulate (tons/yr)	VOC's (tons/yr)	SO 2 (tons/yr)	CO (tons/yr)	NOx (tons/yr)	Lead (tons/yr)	HAPs (tons/yr)	Totals (w/o PM10)
Point	Boiler	8.62	20.28	50.70	26.35	119.15	101.40	126.75	0.024	19.36	442.73
Point	Stacks (Cyclones & Baghouses)	NA	5.31	9.35	NA	NA	NA	NA	NA	NA	NA
Point	Process - kilns	NA	23.75	41.25	187.50	NA	NA	NA	NA	11.76	NA
	subtotal	8.62	49.34	101.30	212.85	119.15	101.40	126.75	0.02	31.12	443.73
Fugitive	Process -										
Fugitive	Processes (sawing, ...)	NA	1.39	2.63	NA	NA	NA	NA	NA	NA	2.63
Fugitive	Transfer - Drops, Conveyors	NA	4.89	12.99	NA	NA	NA	NA	NA	NA	12.99
Fugitive	Storage - Bins	NA	0.06	0.11	0.004	NA	NA	NA	NA	NA	0.11
Fugitive	Vehicle Traffic	NA	23.31	73.90	NA	NA	NA	NA	NA	NA	73.90
	subtotal	0.00	29.66	89.63	0.00	0.00	0.00	0.00	0.00	0.00	89.64
	Total	8.6	79.0	190.9	212.9	119.1	101.4	126.8	0.02	31.12	532.4

INCREASE IN EMISSIONS AS A RESULT OF THE PROPOSED ACTION

	Source	Condensibles (tons/yr)	PM 10 (tons/yr)	Particulate (tons/yr)	VOC's (tons/yr)	SO 2 (tons/yr)	CO (tons/yr)	NOx (tons/yr)	Lead (tons/yr)	HAPs (tons/yr)	Totals (w/o PM10)
Point	Boiler	4.38	10.31	25.76	12.88	60.54	51.53	64.41	0.012	9.84	224.97
Point	Stacks (Cyclones & Baghouses)	NA	5.31	9.35	NA	NA	NA	NA	NA	NA	NA
Point	Process - kilns	NA	18.05	31.35	142.50	NA	NA	NA	NA	8.94	NA
	subtotal	4.38	33.68	66.46	155.38	60.54	51.53	64.41	0.01	18.77	224.97
Fugitive	Processes										
Fugitive	Processes (kilns, sawing, ...)	NA	1.39	2.63	NA	NA	NA	NA	NA	NA	2.63
Fugitive	Transfer - Drops, Conveyors	NA	4.89	5.86	NA	NA	NA	NA	NA	NA	5.86
Fugitive	Storage - Bins	NA	-2.85	-4.89	0.004	NA	NA	NA	NA	NA	-4.89
Fugitive	Vehicle Traffic	NA	19.13	52.45	NA	NA	NA	NA	NA	NA	52.45
	subtotal	0.00	22.47	56.05	0.00	0.00	0.00	0.00	0.00	0.00	56.06
	Total	4.38	56.23	122.51	155.39	60.54	51.53	64.41	0.01	18.77	281.03

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AIR QUALITY PERMIT APPLICATION ASSUMPTIONS
Revised 10/18/05

INTRODUCTION

The thru-put quantities for the sawmill on this application are those quantities developed by a sawmill simulation computer program developed by Halco Software Systems of Vancouver, British Columbia, Canada. This program has industry wide acceptance for reliability in simulation of actual sawmill thru-puts. Thru-put quantities from other areas were calculated from production records from our existing sawmill at Elk City, Idaho. Those thru-puts for which we have no previous production records were calculated to the best of our ability from experience in the sawmill industry.

GENERAL

- All devices moving logs/refuse/chips/sawdust/ etc are considered **conveyors**.

- All points at which pollution may occur are labeled **transfers**.

FLOW DIAGRAM DESIGNATIONS

- "T" will indicate TRANSFER
- "C" will indicate CONVEYOR
- "P" will indicate PROCESS
- "CY" will indicate CYCLONE
- "S" will indicate STORAGE
- "V" will indicate VOLITILES
- "B" will indicate COMBUSTION SOURCE (Boiler).
- "BH" will indicate BAGHOUSE

PROCESS DESIGNATIONS

- P11 will always be used for the SAWMILL
- P12 will always be used for the *DEFECT SAW*
- P13 will always be used for the *DEBARKER*.
- P14 will always be used for the *MERCHANDIZER*

- P15 will always be used for the *HOG*

- P16 will always be used for the *PLANER*

- P17 will always be used for ROSEBUD HORSE BEDDING.

- P18, P19, P20 and P21 will always be used for the *KILNS*.

- P22 will always be used for the DISC SCREEN

- P24 will always be used for TARGET BOX.

MOISTURE CONTENT CONVERSION FORMULA'S

Green ton = Bone dry ton divided by (1- Moisture content).

Bone Dry ton = Green ton times (1-Moisture content).

LOG – PRODUCTION ASSUMPTIONS

- Log consumption each year will be 120,000,000 Bd Ft, **LOGSCALE**

- 24,000 loads/year (5000 Bd Ft Log Scale/load). Average loads per day = 96 on 250 day/year operating schedule.

- Log yard will operate, 5 days/week, 18 hours/day. Will receive log trucks 8 – 16 hours/day depending on time of year and weather.

LOGYARD

Water truck will be used anytime dust is visible, approximately 75 days per year.

Incoming log trucks will average 5000 bf/load, 58,000 lbs payload with 28,000 lb empty weight, running on an average of 22 wheels.

Unloading and handling of each load will require an average of 800' of machine travel each way per load (1600' round trip), multiplied by the number of "bites" or trips required for a given machine to pack the 58,000 lb load.

LOG WATERING

Storage decks are watered during summer and fall. Sprinklered area has surface drainage system to recycle water.

EMISSION CONTROL ON PAVED SURFACES

-A sweeper unit with water spray is utilized after snow melt and during the dry season whenever dirt or dust is visible on paved surfaces.

SAWMILL – LUMBER PRODUCTION

- Sawmill will produce 250,000,000 BdFt of lumber each year, LUMBER SCALE (This is rough, green lumber before trim losses at the planer.)

- Sawmill will work 250 days/year, 500 - 8 hour shifts/year. Work Monday thru Friday.

- Average unit of lumber out of the sawmill will be 12' long and will contain 4800 Bd' and will weigh 14,000 pounds. Unit will be 22 courses high.

- Sawmill will produce 52,084 units per year, approximately 104 units/8 hour shift.

- Forklifts will carry one unit/trip from the sawmill to the kiln/storage yard.

- Moisture content of incoming logs/lumber 47%

DRY KILN ASSUMPTIONS

- Dry Kilns are 88' long and all are double track units. Each kiln charge will average 82 feet long and will contain 196,800 Bd Ft of lumber per charge. 1271 Charges/year.

- The average weight of a dry unit coming out of the kilns will be 8,400 pounds. 1.75 #/Bd Ft.

- Forklifts will carry 1 ½ units per trip from the kilns to the planer infeed or storage area, on paved surfaces.

- Moisture content of lumber leaving the kilns – 19%

- Vents on Kiln #1(kiln on west side) are 22'- 6" above the ground and have 74 Sq Ft of vent area.

- Vents on Kiln #2 and #3 are 22' – 9" above ground and have 67.3 Sq Ft of vent area on each kiln.

- Vents on Kiln #4 are 22' above ground and have 98 SqFt of vent area.

BOILER

- Moisture content of boiler fuel/hog fuel – 47%

- Fuel consumption of boiler – 27,215 #/Hr (200 cu ft = 1 unit = 2000#) **<u>47% M.C.</u>**

- Fuel consumed/year – 24/7/50 = 8400 hours/year = 60,547 **<u>Bone Dry Tons</u>**/year.

- Ash generated is 1% of fuel weight = 605 BDT

PLANER

- Planer will work 250 days/year, 2 – 8 hour shifts/day, 500 shifts/year. Production will be about 240,000,000 Bd. Ft. of lumber. (250 MMbf of rough, green lumber at sawmill yields 240 MMbf out of the planer.)

- Average unit coming out of the planer will be 12' long, 13 - 2x4's wide and 21 courses high and will contain 2185 Bd Ft. This will be dry, surfaced wood that will average 1.65 lbs/bf. This is 109,840 units/year. 220 units/8 hour shift.

Planer lift truck taking from packager will average 1 ½ units/trip on paved surfaces.

SHIPPING

- Shipping will handle 109,840 units of lumber per year, or 220/8hr shift. Average wt. per unit is 3600 lbs, based on a species weighted average of 1.65 lbs/bf. Lift trucks will average 1 ½ units per trip.

-3 Hyster H190XL2 forklifts will load units on trucks. Two truck loading zones are located in middle of storage yards. Forklifts will take all units to storage areas.

- Lumber truck will have about 35,000 Bd Ft of lumber on each load. This is 6,857 truck loads of lumber/year, or 27/10hr shift, hauling on an average of 22 wheels.

SOLID MATERIAL TRANSPORT, HANDLING, AND STORAGE

Note – 1 unit = 200 cu.ft.
- Truck Shavings bin – 42 units
- Truck Chip bins – 90 units
- Truck sawdust bin - 62 units
- Bark/Hog fuel truck bin – 30 units
- Boiler fuel bins (2) – 150 units each.
- Planer chips truck bin – 24 units

- Log yard waste (temporary storage) – (wood, logs, dirt, rocks, etc.). Surface area of storage piles – 10 acres.

ROSEBUD

- Rosebud will work 2 – 40 hour shifts each week. 4000 hours/year.
- Forklift travels 10' outside the building on loading dock to van body semi-trailers.
- Operation loads and ships an average of 2 (two) semi-trailer loads/day.

Rosebud buys shavings from off-site sources. The purchased material is an additional 15% of the amount received from the planer. Off site shavings are trucked to site with live bottom, 18 wheel trucks, 265 loads/year. Average net weight of the loads is 22,000#.

Trucks from off-site are unloaded inside the storage building.

Caterpillar bucket loader is used inside enclosed bldg to move material. Storage building is 95% enclosed.

STORAGE & HANDLING OF LIQUID SOLVENTS AND OTHER VOLATILES

- Diesel storage tanks – 1 – 15,000 and 1 – 10,500 gallon tank. Est. yearly usage – 400,000 gallons. Tank usage is pro-rated on a 60/40 basis, roughly 240,000 gallons/year thru the 15,000 Gallon tank and 160,000 Gallons/year thru the 10,500 Gallon tank.

- 2 Parts washers, using 365 solvent, 15 gallon tank, 80 gallons thru put per year each, parts washed in pan with 4 SQ FT open area, covered with lid when not used, fugitive type emissions, tank filled from barrel.

- Lubricants and heavy oils, stored in drums in sawmill, planer, boiler and truck repair shop, supplied by vendor. Est. use 50,000 gallons/year.

Wellons MACT HAP emissions calculations

MM BTU/HR HEAT INPUT		50	75	100	110	115	120	125	Grangeville Unit
	mmBTU	219.0	328.5	438.0	481.8	503.7	525.6	547.5	115.6 MMBtu/hr
AP-42 FACTORS	lb/mmBtu								
Acetaldehyde	8.30E-04	0.1818	0.2727	0.3635	0.3999	0.4181	0.4362	0.4544	0.4206
Acetophenone	3.20E-09	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Acrolein	4.00E-03	0.8760	1.3140	1.7520	1.9272	2.0148	2.1024	2.1900	2.0280
Benzene	4.20E-03	0.9198	1.3797	1.8396	2.0236	2.1155	2.2075	2.2995	2.1294
bis(2-Ethylhexyl)phthalate	4.70E-08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon tetrachloride	4.50E-05	0.0099	0.0148	0.0197	0.0217	0.0227	0.0237	0.0246	0.0228
Chlorine	7.90E-04	0.1730	0.2595	0.3460	0.3806	0.3979	0.4152	0.4325	0.4005
Chlorobenzene	3.30E-05	0.0072	0.0108	0.0145	0.0159	0.0166	0.0173	0.0181	0.0167
Chloroform	2.80E-05	0.0061	0.0092	0.0123	0.0135	0.0141	0.0147	0.0153	0.0142
2,4-Dinitrophenol	1.80E-07	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Ethylbenzene	3.10E-05	0.0068	0.0102	0.0136	0.0149	0.0156	0.0163	0.0170	0.0157
Formaldehyde	4.40E-03	0.9636	1.4454	1.9272	2.1199	2.2163	2.3126	2.4090	2.2306
Hydrogen chloride	1.90E-02	4.1610	6.2415	8.3220	9.1542	9.5703	9.9864	10.4025	9.6330
Naphthalene	9.70E-05	0.0212	0.0319	0.0425	0.0467	0.0489	0.0510	0.0531	0.0492
4-Nitrophenol	2.40E-07	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Pentachlorophenol	5.10E-08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Phenol	5.10E-05	0.0112	0.0168	0.0223	0.0246	0.0257	0.0268	0.0279	0.0259
Propionaldehyde	6.10E-05	0.0134	0.0200	0.0267	0.0294	0.0307	0.0321	0.0334	0.0309
Styrene	1.90E-03	0.4161	0.6242	0.8322	0.9154	0.9570	0.9986	1.0403	0.9633
2,3,7,8-Tetrachlorodibenzo-p-dioxins	8.60E-12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	9.20E-04	0.2015	0.3022	0.4030	0.4433	0.4634	0.4835	0.5037	0.4665
2,4,6-Trichlorophenol	2.20E-08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vinyl Chloride	1.80E-05	0.0039	0.0059	0.0079	0.0087	0.0091	0.0095	0.0099	0.0091
o-Xylene	2.50E-05	0.0055	0.0082	0.0110	0.0120	0.0126	0.0131	0.0137	0.0127
Antimony	7.90E-06	0.0017	0.0026	0.0035	0.0038	0.0040	0.0042	0.0043	0.0040
Arsenic	2.20E-05	0.0048	0.0072	0.0096	0.0106	0.0111	0.0116	0.0120	0.0112
Beryllium	1.10E-06	0.0002	0.0004	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006
Cadmium	4.10E-06	0.0009	0.0013	0.0018	0.0020	0.0021	0.0022	0.0022	0.0021
Chromium, total	2.10E-05	0.0046	0.0069	0.0092	0.0101	0.0106	0.0110	0.0115	0.0106
Cobalt	6.50E-06	0.0014	0.0021	0.0028	0.0031	0.0033	0.0034	0.0036	0.0033
Lead	4.80E-05	0.0105	0.0158	0.0210	0.0231	0.0242	0.0252	0.0263	0.0243
Manganese	1.60E-03	0.3504	0.5256	0.7008	0.7709	0.8059	0.8410	0.8760	0.8112
Mercury	3.50E-06	0.0008	0.0011	0.0015	0.0017	0.0018	0.0018	0.0019	0.0018
Nickel	3.30E-05	0.0072	0.0108	0.0145	0.0159	0.0166	0.0173	0.0181	0.0167
Selenium	2.80E-06	0.0006	0.0009	0.0012	0.0013	0.0014	0.0015	0.0015	0.0014
TOTAL EPA HAPS (tons/yr)	3.82E-02	8.3613	12.5419	16.7226	18.3948	19.2310	20.0671	20.9032	19.3572

Bennett Forest Industries
Permit to Construct Application

OLYMPIC REGION CLEAN AIR AGENCY

DRY KILN EMISSION FACTORS

APRIL 8, 1999

(partial copy containing lumber production emission factors)

OLYMPIC REGION CLEAN AIR AGENCY - DRY KILN FACTORS

(4/8/99)

...\Notes\Dry Kiln Factor.doc

Wood Species	Pollutant	Factor Value	Unit of Measure	Footnote No.
Douglas Fir	PM	0.11	lb / MBF (green)	1
	PM-10	0.11	lb / MBF (green)	1, 6
	VOC as Carbon	0.28	lb / MBF (green)	2
	VOC (Total VOC)	0.32	lb / MBF (green)	4
	Pinenes	0.32	lb / MBF (green)	3, 4
	Phenol	0.004	lb / MBF (green)	3, 4
Hemlock	PM	0.04	lb / MBF (green)	1
	PM-10	0.04	lb / MBF (green)	1, 6
	VOC as Carbon	0.12	lb / MBF (green)	2
	VOC (Total VOC)	0.14	lb / MBF (green)	4
	Pinenes	0.14	lb / MBF (green)	3,4
	Phenol	0.002	lb / MBF (green)	3,4
Cedar	(use Hemlock factors)			
Alder	PM	0.11	lb / MBF (green)	1, 5
	PM-10	0.11	lb / MBF (green)	1, 6
	VOC as Carbon	0.26	lb / MBF (green)	2
	VOC (Total VOC)	0.29	lb / MBF (green)	4, 5
	Pinenes	0.29	lb / MBF (green)	3,4,5
	Phenol	0.003	lb / MBF (green)	3,4,5

Notes:

1. PM Factors Ref.: Weyhaeuser Office of the Environment, e-mail from Ken Johnson 3/9/99; also hemlock factor submitted as part of Weyerhaeuser Raymond Air Operating Permit Application 5/95.

1.1 PM factors: $PM = PM_{Filterable} + PM_{Condensable}$

1.2 An emission factor for PM from drying southern yellow pine was derived form an average of Weyerhaeuser test data and data in the NCASI wood products data base. The average total particulate (filterable plus condensable) was 0.097 lb *PM/MBF of southern pine dried.*

1.3 *The emission factor for hemlock and douglas fir was developed with the assumption that the particulate emissions are mostly vaporized wood extractives, and that the amount emitted is proportional to the wood extractive content.*

1.4

SPECIES	% EXTRACTIVE CONTENT
Southern Yellow Pine (SYP)	4.8
Douglas Fir (DF)	4.4
Western Hemlock (WH)	1.6

1.5 Calculations e.g. for Douglas Fir:

DF = (0.097 lb PM/MBF SYP)(4.4% DF / 4.8% SYP) = 0.089 lb PM / MBF

A safety factor of 25% was added.

DF = 0.089 lb / MBF + ((0.25)(0.089 lb/MBF) = 0.11 lb PM / MBF Douglas Fir

2. VOC Factors Ref.: Dry Kiln VOC Emissions - Scott Inloes SWAPCA (NOC), – Horizon Engineering – Cowlitz Stud Mill, (12/97) Factors: Douglas Fir – VOC as C 0.28 lb/MBF @ 10% m.c., Hemlock VOC as C 0.12 lb/MBF @ 10% m.c., Alder VOC as C 0.26 lb VOC as C @ 10% m.c.

2.1 VOC measurements were made in a laboratory size lumber dry kiln. VOC was measured with a flame analyzer.

2.2 It appears that a flame ionization analyzer may also measure some of the condensable PM; however it is not clear how much of condensable particulate would be ionized in the detector.

3. VOC composition:

VOC emission species for Douglas Fir = 99% Terpene, 1 % Phenol - OAPCA - NOC - Pacific Veneer / CH2M Hill (2/4/94 letter from CH2M Hill).

Weyerhaeuser-OAPCA - NOC #646 (gives 99% turpentine, 1% phenol)

EPA Air Emissions Species Manual EPA-450/2-88-003a (4/88): 99.9 % wt. pinene isomers MW 136.2 -[species data for veneer dryer]

Factor Pinene Isomers (α - pinene, β - pinene):

(0.28 lb VOC as C / MBF)[(136.2 MW Pinene) / (12 MW C) (10 carbons - pinene)] (99% / 100%) = 0.32 lb pinene isomers / MBF Douglas Fir

Factor Phenol: (0.28 lbs VOC as C / MBF) [(94.1MW Phenol) / (12) (6)] (1 % / 100%) = 0.004 lb phenol / MBF

Factor VOC (Total VOC) = (pinene isomers factor + phenol factor) = 0.324 lb VOC/MBF

4. *Pinenes Factor and VOC (Total VOC) Factor – e.g. calculations for Douglas Fir*

Factor Pinene Isomers (α - pinene, β - pinene):

(0.28 lb VOC as C / MBF)[(136.2 MW Pinene) / (12 MW C) (10 carbons - pinene)] (99% / 100%) = 0.32 lb pinene isomers / MBF Douglas Fir

Factor Phenol: (0.28 lbs VOC as C / MBF) [(94.1MW Phenol) / (12.01) (6)] (1 % / 100%) = 0.004 lb phenol / MBF

Factor VOC (Total VOC) = (pinene isomers factor + phenol factor) = 0.324 lb VOC/MBF

5. *Alder*

5.1 *PM:* Let Alder = Douglas Fir. In the VOC tests (see "2" above) Alder had VOC rates similar to Douglas Fir.

5.2 Pinene isomers, phenol. Let Alder = Douglas Fir

6. PM-10: Assume PM-10 = PM, this is a conservative estimate based on process knowledge, no test data available.

7. Spruce: Let Spruce = Douglas Fir for all emission factors

8. Cedar: VOC emissions for Cedar are similar to Hemlock, Weyco Data, Project # 044-9434. Use Hemlock factors for cedar

9. Companies wishing to develop their own emission factors, based on direct testing, are encouraged to do so. A stack test protocol must be approved by OAPCA and an OAPCA representative must be present during the test. A test done by companies prior to 4/99, after review, may also be accepted by OAPCA.

Small-scale Kiln Study Utilizing Ponderosa Pine, Lodgepole Pine, White Fir, and Douglas-fir

Report to

Intermountain Forest Association
P.O. Box 3075
Coeur d'Alene, ID 83816

Report by

Michael R. Milota
Department of Forest Products
Oregon State University
Corvallis, OR 97331

September 29, 2006

TABLE 1. Summary of drying times and total hydrocarbon, methanol, and formaldehyde released. Values are adjusted to 12% moisture content for ponderosa pine and 15% moisture content for the other species.

	Event	Volume (brd ft)	Time to final MC (hrs:min)	VOCs as Carbon (g/event)	VOCs as Carbon (lbs/mbf)	VOCs as Carbon (g/kg[illegible])	Methanol, (lb/mbf)	Formaldehyde, (lb/mbf)
ponderosa	2	75.66	56:26	46.1	1.40	0.85		
ponderosa	3	75.66	57:07	44.7	1.30	0.78		
ponderosa	4	75.66	55:02	47.5	1.29	0.80	0.050	0.0022
ponderosa	5	75.66	57:04	57.7	1.54	1.06	0.069	0.0036
ponderosa			56:54		1.38	0.86	0.066	0.0029
white fir	1	73.33	36:10	8.40	0.26	0.16		
white fir	2	73.33	43:19	8.84	0.27	0.18		
white fir	3	73.33	42:36	7.43	0.22	0.14	0.096	0.0022
white fir	4	73.33	46:54	8.42	0.26	0.16	0.148	0.0034
white fir ave.			42:17		0.26	0.156	0.122	0.0028
lodgepole	2	80.66	16:34				0.062	0.0041
lodgepole	3	80.66	16:49	43.7	1.19	0.74		
lodgepole	4	80.66	16:01	43.9	1.17	0.71	0.069	0.0041
lodgepole	5	80.66	16:01	32.0	0.87	0.56	0.056	0.0036
lodgepole			16:13		1.06	0.67	0.060	0.0040
Douglas-fir	1	73.33	23:31	17.1	0.51	0.26	0.026	0:00084
Douglas-fir	2	73.33	26:26	18.4	0.55	0.26	0.023	0.00079
Douglas-fir	3	73.33	27:04	15.0	0.46	0.24	0.026	0.00166
Douglas-fir	4	73.33	26:13	16.3	0.46	0.22	0.018	0.00109
Douglas-fir			26:04		0.49	0.25	0.023	0.0010

MRI

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A-98-44

II B 033

Date: June 9, 2000

Subject: Baseline Emissions Estimates for the Plywood and Composite Wood Products Industry
EPA Contract No. 68-D6-0012; EPA Task Order No. 048
MRI Project No. 104808.1.048

From: Katie Hanks and David Bullock

To: Mary Tom Kissell
ESD/WCPG (MD-13)
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

EPA AIR DOCKET

I. Introduction

The U. S. Environmental Protection Agency (EPA) is developing national emission standards for hazardous air pollutants (NESHAP) for the plywood and composite wood products source category. Plywood and composite wood products include the following: medium density fiberboard (MDF), particleboard, hardboard, fiberboard, oriented strandboard (OSB), softwood plywood and veneer, hardwood plywood and veneer, and engineered wood products (EWP).

The purpose of this memorandum is to document the methodology used to estimate nationwide uncontrolled and baseline air emissions from the plywood and composite wood products source category. Uncontrolled emission estimates are developed without consideration of air pollution controls currently in use at wood products plants. Baseline estimates reflect the level of pollution control that is presently used. Section II of this memorandum discusses the general methodology used to estimate uncontrolled and baseline emissions. Section III discusses in more detail the approach to estimating emissions for various equipment. Section IV presents the nationwide emission estimates, and Section V presents the estimated number of major sources.

II. General Approach

Estimating uncontrolled and baseline emissions involves the following four steps:

(1) Identification of hazardous air pollutant (HAP) emission sources,

(2) Characterization of emission sources (e.g., assignment of throughput and other characteristics),

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APPENDIX D

LUMBER KILN EMISSION FACTORS

D-1

LUMBER KILN EMISSION FACTORS

General

Lumber kilns are emission sources co-located at plywood and composite wood products plants. Lumber kilns are typically used by sawmills located on the same site with panel plants. Lumber kilns are also used to dry lumber for use in onsite manufacture of engineered wood products.

Lumber kilns are batch units. Lumber is loaded into the kiln, the kiln runs through the drying cycle, and the dried lumber is removed from the kiln when the drying cycle is complete. Softwood lumber kiln drying cycles typically last around 24 hours, while hardwood kiln drying cycles can last from several days to weeks. The emissions profile from lumber kilns depends on kiln drying time, moisture content of the wood, kiln temperature, and air flow through the kiln. The amount and direction of air that is vented from the kiln changes in response to kiln process parameters such as relative humidity, dry bulb temperature, and wet bulb temperature. Lumber kilns have multiple vents, which alternate in function. During any given time, one set of vents allows moisture to exhaust from the kiln while the other set of vents brings in dry air. After some time, the direction of air circulation within the kiln is changed, and the kiln vents exchange functions. Because of these changes in air flow patterns, lumber kiln emission streams vary in flow rate, concentration, and mass emission rate throughout the kiln drying cycle. In addition to emissions from lumber kiln vents, considerable amounts of fugitive emissions may be emitted from lumber kilns through crevices in the kiln wall and around doors.

It is difficult to measure emissions from lumber kilns due to the kiln air flow design and fugitive emissions. Therefore, little emissions test data is available for use in developing emission factors for lumber kilns. Methods for quantifying lumber kiln flow rates vary from test to test. Most of the emissions test data that is available contains calculated flow rates or other assumptions that bring the validity of the data into question. However, a number of studies and tests have been conducted to determine THC emissions from softwood lumber kilns. A few tests have been conducted to determine emissions of HAP from softwood lumber kilns. This appendix summarizes the results on several lumber kiln studies and tests and presents the emission factors used to estimate uncontrolled and baseline emissions from lumber kilns.

Summary of Lumber Kiln Studies

The University of Idaho conducted a bench-scale lumber kiln study where various types of softwood lumber were dried. The results of the Idaho University study were published in NCASI Technical Bulletin No. 718. The purpose of the study was to evaluate the accuracy of Method 25A while obtaining THC measurements for southern and western softwood species using the drying schedules for each species commonly used in full-scale kilns. Total THC emissions for the entire drying cycle (after accounting for fugitive losses from the kiln) for non-pine softwood species ranged from 0.12 to 0.81 pounds as carbon per thousand board feet lb/MBF, while the emissions ranged from 1.86 to 3.32 for pine species. Table D1 presents the

THC emissions for each wood species tested. These emission rates are within the range of those reported at full-scale kilns.[1]

TABLE D1. THC EMISSION POTENTIALS FROM LUMBER DRYING[1]

Wood species	THC emissions, lb/MBF (as carbon)
Non-pine species:	
Redwood	0.12
Cedar	0.12
Douglas fir sapwood	0.21
Hemlock	0.24
Coastal Douglas fir	0.34
Grand fir	0.53
White fir	0.57
Douglas fir heartwood	0.81
Non-pine species average	0.37
Pine Species:	
Ponderosa pine	1.86
Sugar pine	2.07
White pine	2.26
Southern yellow pine (AR)	2.36
Southern yellow pine (TX)	3.32
Pine species average	2.37
Overall study average	1.1

MacMillan Bloedel Packaging used another approach to quantify THC emissions from lumber drying operations. Continuous measurement of THC was performed using EPA Method 25A and gas laws and combustion stoichiometry were used to estimate volumetric flow from a steam-heated kiln and a direct natural gas-fired kiln (both drying softwoods). For the steam-heated kiln, moisture loss during the drying cycle was used as the basis for volumetric flow estimations. Kiln moisture loss was determined by collecting kiln condensate and by weighing the wood before and after drying to measure the difference in wood weight due to moisture loss. For the natural gas-fired kiln, combustion stoichiometry and measured moisture loss were used to estimate volumetric flow rate from the kiln. The THC emission factors developed based on the measured THC concentrations and calculated flow rates were 1.7 lb/MBF for the steam-heated

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kiln and 1.4 lb/MBF for the direct gas-fired kiln. These emission factors are consistent with those obtained by directly measuring kiln flow rate.[3]

Temple-Inland Forest Products conducted testing to measure THC, methanol, and formaldehyde emissions from two softwood lumber kilns (one steam-heated kiln and one direct-fired kiln) using a water mass balance (WMB) approach. Emissions of THC were measured using EPA Method 25A. The EPA Method 308 (modified) was used to measure formaldehyde and methanol. The WMB approach is based on the concept that the mass of water entering the kiln equals the mass of water exiting the kiln. Sources of water introduced into the kiln are moisture in the lumber and air, and for direct-fired kilns, moisture in the fuel and water generated from combustion. The mass of water exiting the kiln through the kiln vents and fugitive sources is calculated from the difference of the water entering the kiln and exiting the kiln in the dried lumber and kiln condensate. The pollutant concentration and calculated moisture content of gas emitted from the kiln are used to calculate the pollutant mass emission rate. (The WMB approach assumes that the moisture and pollutant concentration in the vent gas and fugitive gas are the same.) The emission factors developed based on the Temple-Inland test results are presented in Table D2. The gas moisture, methanol, and formaldehyde data from the direct-fired kiln mill were inconsistent and were determined to be invalid.[3]

TABLE D2. SUMMARY OF TEST RESULTS OBTAINED WITH WATER MASS BALANCE APPROACH[3]

Pollutant	Steam-heated softwood kiln	Direct-fired softwood kiln
THC as C, lb/MBF	1.88	2.49
Methanol, lb/MBF	0.26	invalid
Formaldehyde, lb/MBF	0.025	invalid

In addition to the studies outlined above, the NCASI has developed a draft data base of lumber kiln emission test results.[4] The data base contains test results for softwood lumber kilns only. Emission factors for THC and some HAP's reported in the draft database were averaged and are presented in Table D3. The THC emissions were measured using Method 25A. Method TO-5 was used to determine aldehyde and ketone emissions, and method TO-8 was used to determine phenol emissions. The draft NCASI data base includes comments for most of the tests summarized in the data base. Tests with suspect results (as indicated in the NCASI comments) were not included in the averages presented in Table D3. After elimination of the suspect emission factors, the averages in Table D3 were calculated by first averaging all of the emission factors for each individual kiln (if more than one test was performed at the kiln), and then averaging the factors for all kilns for each pollutant. The emission factors in Table D3 compare with those developed using data from the other studies discussed above.

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TABLE D3. AVERAGE EMISSION FACTORS IN THE NCASI DRAFT LUMBER KILN DATABASE[a]

Pollutant	Softwood, direct-fired kilns, lb/MBF	Softwood, steam-heated kiln, lb/MBF
THC	2.4	2.3
Acetaldehyde	0.041	0.0078
Formaldehyde	0.034	0.0043
MEK	0.0080	0.00129
Phenol	0.010	Below detection limit

Georgia-Pacific sponsored a lumber kiln study performed by NCASI to examine the potential for measuring emissions from small-scale lumber kilns and using the results to estimate emissions from full-scale kilns. The study consisted of two phases. The purpose of the first phase of the study was to evaluate the variability among four different small-scale kilns and among sampling events at the individual small-scale kilns. The second phase of the study was to compare the emission test results from two full-scale kilns (one direct-fired and one indirect-fired) to the test results from two small-scale kilns. All of the small-scale kilns in the study are heated by indirect means. All of the kilns (small- and full-scale) were used to dry southern pine lumber. Draft results from the Georgia-Pacific lumber kiln study were reviewed. The total HAP and VOC emission test results were determined to be of the same magnitude as the emission factors used for the baseline emission estimates (discussed below). The final report documenting the Georgia-Pacific lumber kiln study was not available as of this writing. Therefore, the results of the study were not incorporated into the baseline emission estimates for lumber kilns. The results from the Georgia-Pacific lumber kiln study will eventually be included in the NCASI draft lumber kiln data base and the data base will be further refined (i.e., new data will be added and values that could not be recalculated by NCASI will be removed). The result will be a comprehensive summary on emissions from lumber kilns.[46]

Emission test data for hardwood lumber kilns is not available. Hardwood lumber is dried at a lower temperature for longer amounts of time than is softwood lumber. Therefore, hardwood lumber kilns are likely to have a very different emissions profile than softwood lumber kilns. For comparison, consider the differences in hardwood and softwood veneer dryers. Hardwood veneer dryers operate at temperatures approximately 100 degrees lower than softwood veneer dryers. Hardwood veneer dryers typically emit less THC and less HAP than softwood veneer dryers. Thus, it is reasonable to believe that hardwood lumber kilns emit less THC and HAP than softwood lumber kilns.

Emission Factors Used to Estimate Baseline Emissions

Emission factors were developed based on the results of the studies discussed above. The resulting emission factors are presented in Table D4. The ratio of hardwood veneer dryer to

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softwood veneer dryer emissions (for indirect-fired veneer dryer heated zones) was used to approximate emission factors for indirect-fired hardwood lumber kilns. Approximation of direct-fired, hardwood lumber kiln emission factors was not necessary because there are no known direct-fired, hardwood lumber kilns.

TABLE D4. LUMBER KILN EMISSION FACTORS

Pollutant	Reference	lb/MBF for each kiln type		
		DFIRE (SW)	INHEAT (SW)	INHEAT (HW)
THC	NCASI data base	2.4	2.3	
	Tech. Bull 718		1.14	
	MacMillan Bloedel	1.4	1.7	
	Temple-Inland	2.48	1.88	
	Average THC	2.1	1.8	0.26
Acetaldehyde	NCASI data base	0.041	0.0078	0.0819
Formaldehyde	NCASI data base	0.084	0.0043	
	Temple Inland	0.025		
	Average HCHO	0.050	0.0043	0.00034
MEK	NCASI data base	0.0080	0.0013	no ratio[b]
Phenol	NCASI data base	0.010	BDL	BDL
Methanol	Temple Inland	0.26	0.22[a]	0.22
Total HAP		0.35	0.24	0.23

DFIRE - direct-fired; INHEAT - indirect-fired; SW - softwood; HW - hardwood.

[a] The ratio of the direct-fired softwood THC and indirect-fired hardwood THC emission factors was applied to arrive at an estimated methanol emission factor for indirect-fired lumber kilns.

[b] Emissions of MEK were below detection limit (BDL) for the hardwood and softwood veneer dryers used to ratio the emission factors for hardwood lumber kilns.

References

1. *A Small-Scale Study on Method 25A Measurements of Volatile Organic Compound Emissions From Lumber Drying*, NCASI Technical Bulletin No. 718, July 1996.

2. Glass, M., and D. Elam. "Innovative Procedures to Quantify Volatile Organic Compound Emission From Lumber Kilns," 1995 TAPPI International Environmental Conference Proceedings, Book 1, p. 235.

3. *Lumber Kiln Emissions Testing*, Diboll and Buna, Texas, Test Dates January 20-23, 1998 (Diboll) and January 26-29, 1998 (Buna), prepared for Temple-Inland Forest Products Corporation, by Roy F. Weston, Inc., Work Order No. 06398-011-001, April 1, 1998.

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4. Letter from D. Word, NCASI, to R. Marinshaw, MRI. April 21, 1995. Transmittal of the NCASI draft lumber kiln data base.

5. R. Nicholson and K. Hanks, MRI, to P. Lassiter, EPA/ESD. January 27, 1998. Minutes of January 26, 1998 Meeting With Representatives from the Wood Products Industry and Trade Associations.

6. K. Hanks, MRI, to M. Kissell, EPA/ESD. November 18, 1999. Minutes of a November 16, 1999 Meeting with Wood Products Industry and Trade Association Representatives.

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PROCESS WEIGHT RATE CALCULATION

Facility: Bennett Forest Industries, Grangeville Sawmill
Permit No.: P-050214
Facility Identification No.: 049-00003

Process[a]	Does process dehydrate sugar beet pulp or alfalfa?[b]	Process Weight Rate[c]	Commencing Operating Date[d]	Allowable Emissions[e]	Estimated Emissions[f]	In compliance?[g]	Note
	"yes/no"	lb/hr	m/d/yr	lb/hr	lb/hr	(Y/N)	
Cyclone 11	no	1000	2/15/06	2.84	0.02	Y	
Cyclone 12	no	6440	2/15/06	8.68	0.77	Y	
Cyclone 41	no	1.5	2/15/06	0.06	0.0018	Y	
Cyclone 71	no	3940	2/15/06	6.46	1.18	Y	
Cyclone 72	no	11200	2/15/06	11.32	0.27	Y	
Cyclone 73	no	11200	2/15/06	11.32	3.36	Y	
Cyclone 74	no	11200	2/15/06	11.32	0.32	Y	
Kilns 1-4	no	76000	2/15/06	18.26	6.79	Y	

[a] Input the name of the process or the equipment that is subject to IDAPA 58.01.01.700 - process weight rate limitations.

[b] If the process is used to dehydrate sugar beet pulp or alfalfa put "yes" otherwise put "no".

[c] Process weight rate (permitted or rated maximum throughput rate) in pound per hour (lb/hr).

[d] Process or equipment commencing operating date. If the day and the month are not available, put 1/1 for the month and the day.

[e] The cell is programmed so that it automatically picks up the right equation from the following equations based on your input of the type of process, the process weight rate, and process commencing operating

IDAPA 58.01.01.701 Any process or process equipment commencing operation on or after October 1, 1979

a. If PW is less than 9,250 lb/hr
$E = 0.045*(PW)^{0.60}$
b. If PW is equal to or greater than 9,250 lb/hr
$E = 1.10*(PW)^{0.25}$

IDAPA 58.01.01.702 Any process or process equipment operating prior to October 1, 1979

a. If PW is less than 17,000 lb/hr
$E = 0.045*(PW)^{0.60}$
b. If PW is equal to or greater than 17,000 lb/hr
$E = 1.12*(PW)^{0.27}$

IDAPA 58.01.01.703 Particulate Matter -- Other processes.
If the equipment is used exclusively to dehydrate sugar beet pulp or alfalfa, the following process weigh rate rules apply.

a. If P is less than sixty thousand (60,000) pounds per hour,
$E = 0.02518(PW)^{0.67}$
b. If P is greater than or equal to sixty thousand (60,000) pounds per hour,
$E = 23.84(PW)^{0.11} - 40$

[f] Input respective emissions rate in lb/hr.

[g] The cell is programmed so that it automatically compares emissions rate with process weight rate limitation and shows "Y" if the process is incompliance with the process weight rate limitation otherwise shows

APPENDIX B

P-050214

Modeling Review

MEMORANDUM

DATE: April 12, 2006

TO: Ken Hanna, Permit Writer, Air Program

THROUGH: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program KS

FROM: Darrin Mehr, Air Quality Analyst, Air Program DM

PROJECT NUMBER: P-050214

SUBJECT: Modeling Review for Bennett Forest Industries 15-day Permit to Construct Modification Application for their facility in Grangeville, Idaho.

1.0 SUMMARY

Bennett Forest Industries (Bennett) submitted a 15-day Pre-Permit to Construct (PTC) application for the installation of a lumber drying kiln, sawmill equipment, and a production increase from 60 million board feet per year (MMbf/yr) of lumber to 250 MMbf/yr, at the facility located in Grangeville, Idaho. This project is a modification to PTC No. P-040214, issued on July 29, 2005. The PTC modification application was received on October 21, 2005. An additional emissions inventory was received on January12, 2006, and a modeling demonstration for drying kiln acetaldehyde emissions was received by DEQ on January 13, 2006.

A facility draft PTC package was issued on February 9, 2006. Comments on the facility draft permit, technical memorandum, and modeling review analyses were received by email on February 24, 2006. Revised modeling files were received by email on February 27, 2006. The facility requested that an additional fifth lumber drying kiln be incorporated in the PTC modification project. Revised modeling files included revisions to toxic air pollutant (TAP) emissions from the Wellons boiler and the five lumber drying kilns. The February 24 and 27, 2006, submittals included revised modeling demonstrations for PM_{10}, formaldehyde, and acetaldehyde. Revisions to the compliance demonstration for arsenic relied upon the previously-submitted modeling scenario for a 1 lb/hr emission rate for the boiler. Arsenic impacts were evaluated using an emission increase related to 515,251 MMBtu/yr.

According to the application's February 24 and February 27, 2006, supplemental modeling, and comments on the facility draft permit, steam production from the existing woodwaste-fired boiler will increase from the current permitted capacity of 35,000 lb/hr to 80,000 lb/hr on a basis of 24 hours or less. The boiler is rated at 80,000 lb/hr, and this is the requested operational limit for all averaging periods. Ambient impacts for the boiler's arsenic emissions were just below the acceptable ambient concentration for carcinogens (AACC) and were based an increase in the annual heat input of woodwaste to the boiler of 515,251 MMBtu/yr.

Air quality analyses involving atmospheric dispersion modeling of emissions associated with the facility were submitted in support of a permit application to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02).

A technical review of the submitted air quality analyses was conducted by DEQ. The submitted modeling analyses in combination with DEQ's staff analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
TAPs modeling method of compliance with the TAPs increments relied upon assumptions of operational control. Bennett assumed the following wood species mix for the lumber drying kilns: 50% white fir; 35% Douglas fir; and, 15% ponderosa pine. (lodgepole pine was not included) The emissions are limited by using the percentages of each wood specie processed in calculating an average TAP emission factor. This results in a "controlled emission rate" and a "controlled ambient concentration" for TAPs compliance.	In order to not unduly restrict operation of the kilns by limiting processing to the species and percentages relied upon in the analysis, the annual amount of formaldehyde used in Bennett's modeling demonstration may be used as an emission rate limit. Restrictions on wood species processed and throughput limits on specific wood species is not necessary provided the monitoring and recordkeeping verify compliance with the annual limit. Bennett modeled total formaldehyde emissions of 570.3 pounds per year for the 5 lumber drying kilns. This value represents the emission increase above the already permitted 60 MMbf/yr of lumber throughput. If an annual emission rate limit is imposed for this project, the limit should clearly identify if the limit is independent of the original baseline allowable throughput of 60 MMbf/yr of lumber or if the existing formaldehyde limit of 144.3 lb/yr, in PTC No. 040214 is subsumed in any new limitation.
Bennett modeled facility-wide formaldehyde emissions and requested removal of an enforceable formaldehyde emission limit on the boiler. Bennett demonstrated through modeling that formaldehyde emissions for this project would not cause ambient impacts above the allowable increment. The permittee states that the boiler has been evaluated at or slightly above the manufacturer's designed rated capacity. Formaldehyde from the five (3 existing and 2 proposed) drying kilns were modeled at a production rate of 250 MMbf/yr. The kiln emission rates assumed an average annual species breakdown that does not represent worst case species, and an annual lumber throughput that is below maximum design capacity. Bennett applied a measure of conservatism to the analysis because only the increased throughput of 190 MMbf/yr for this project is subject to the TAPs increment. The requested throughput increase for this project is the same with five kilns as with the original submittal's four kilns. Therefore it can be assumed that the kilns have additional capacity beyond the requested increase and facility throughput limit of 250 MMbf/yr.	Formaldehyde is emitted by the drying kilns and the boiler. Bennett's analysis used a formaldehyde emission rate of 0.263 lbs/hr from the boiler, which corresponded to an increase of 523,629 MMBtu/yr from previously permitted level. This quantity of woodwaste combusted and the associated emission rate would raise the allowable heat input or steaming rate above the manufacturer's rated equipment capacity. The maximum capacity for the boiler is reached with an increase of 515,251 MMBtu/yr. Accompanying analyses showed that all other TAP and criteria impact limits were met with a boiler steaming rate increase of 517,636 MMBtu/yr. <u>Processing of Lodgepole Pine for Identifying the Kilns' Potential to Emit</u> PTC No. P-040214, issued July 29, 2005, allows for the processing of lodgepole pine. Bennett's submittal does not address drying of any lodgepole pine in the kilns. The formaldehyde emission factor for lodgepole pine is 4.0 pounds per million board feet (lb/MMbf), which predicts greater emissions than for the other tree species. DEQ sensitivity analyses were conducted based on processing of the requested throughput increase of 190 MMbf/yr with lodgepole pine and the maximum increase in woodwaste combustion in the boiler of 515,251 MMBtu/yr. This scenario reflects the maximum potential increase in formaldehyde emissions, and resulted in a predicted ambient impact of 0.0873 $\mu g/m^3$, annual average. This exceeds the allowable increment.
Bennett has requested unrestricted operation of the boiler to its maximum rated capacity of 80,000 pounds per hour (lb/hr) of steam production, on a 24-hour basis, and an annual basis. Bennett applied average hourly TAPs emission rates based on at least 515,251 MMBtu/yr increase in boiler woodwaste combustion for compliance with TAPs increments. This represents the potential hourly emission increase of TAPs for 24-hour and annual averaging periods . Criteria air pollutant emission rates from the boiler representing unrestricted PTE were modeled for NAAQS compliance (NO_x, SO_2, and CO). A factor of 120% of actual or potential average emissions was not applied by Bennett, but maximum rated capacity is represented.	DEQ initially had to increase the emission rates of acrolein and hydrogen chloride to account for the worst-case emission increases and used the highest first high value from the modeling of the 1 lb/hr emission rate. The results are far less than the allowable increment. The February 24 and 27, 2006 emission inventory and modeling data showed compliance with all applicable TAP impact limits at an increase in woodwaste heat input of 515,251 MMBtu/yr or slightly greater. The design concentration for arsenic was 99.6% of the allowable increment. The formaldehyde impact (including the drying kilns) was predicted to be at 99. 9% of the allowable increment. The analyses of the ambient impacts for the boiler have been demonstrated to be below applicable standards for all criteria air pollutants and all TAPs. The boiler may be operated in compliance with applicable standards at a steam production rate of 80,000 lb/hr.

Criteria/Assumption/Result	Explanation/Consideration
Average hourly PM_{10} emission rates multiplied by a factor of 120% were used to establish compliance with the 24-hour NAAQS for all sources except the Wellons boiler and the volume sources.	The Wellons boiler's PM_{10} emissions were estimated using the 1,014,001 MMBtu/yr heat input rate and dividing by 8,760 hr/yr.
Bennett's modeling demonstration used ISC3P-Version 01228, which is an outdated version of ISC-Prime.	DEQ re-ran PM_{10}, formaldehyde, and annual unit emission rate (1.0 lb/hr) pollutant modeling with ISC3P-Version 04269, which is the current version of ISC-Prime. All modeling demonstrations must use the current publicly-available version of the model.

2.0 BACKGROUND INFORMATION

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The Bennett Grangeville facility is located in Idaho County, designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}). There are no Class I areas within 10 kilometers of the facility.

2.1.2 Significant and Full Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources at the facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006.91, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1[st] highest[g]
	24-hour	5.0	150[h]	Maximum 6[th] highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2[nd] highest[g]
	1-hour	2,000	40,000[j]	Maximum 2[nd] highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1[st] highest[g]
	24-hour	5	365[j]	Maximum 2[nd] highest[g]
	3-hour	25	1,300[j]	Maximum 2[nd] highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1[st] highest[g]
Lead (Pb)	Quarterly	NA	1.5[h]	Maximum 1[st] highest[g]

[a] IDAPA 58.01.01.006.91
[b] Micrograms per cubic meter
[c] IDAPA 58.01.01.577 for criteria pollutants
[d] The maximum 1[st] highest modeled value is always used for significant impact analysis
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f] Never expected to be exceeded in any calendar year
[g] Concentration at any modeled receptor
[h] Never expected to be exceeded more than once in any calendar year
[i] Concentration at any modeled receptor when using five years of meteorological data
[j] Not to be exceeded more than once per year

The increase in emissions from the proposed modification are required to demonstrate compliance with the toxic air pollutant (TAP) increments with an ambient impact dispersion analysis for any TAP with a requested potential emission rate that exceeds the screening emission rate limit specified by IDAPA 58.01.01.585 or 58.01.01.586. Table 3 lists the applicable screening emission rates and regulatory limits (allowable increments) for the TAPs of concern for this project.

Table 3. TOXIC AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Screening Emission Rate Limit[a] (lb/hr)[b]	Regulatory Limit (AAC/AACC)[c] ($\mu g/m^3$)[d]	Modeled Value Used[e]
Acrolein (CAS[f] # 107-02-8)	24-hour	0.017	12.5	Maximum 1st highest[g]
Hydrogen chloride (CAS# 7647-01-0)	24-hour	0.05	375	Maximum 1st highest[g]
Acetaldehyde (CAS# 75-07-0)	Annual	3.0E-03	0.45	Maximum 1st highest[g]
Benzene (CAS# 71-43-2)	Annual	8.0E-04	0.12	Maximum 1st highest[g]
Benzo(a)pyrene (CAS# 50-32-8)	Annual	2.0E-06	3.0E-04	Maximum 1st highest[g]
Carbon tetrachloride (CAS# 56-23-5)	Annual	4.4E-04	0.067	Maximum 1st highest[g]
Chloroform (CAS# 67-66-3)	Annual	2.8E-04	0.043	Maximum 1st highest[g]
1,2 Dichloroethane (CAS# 107-6-2)	Annual	2.5E-04	0.038	Maximum 1st highest[g]
Dichloromethane (Methylene chloride) (CAS# 75-09-2)	Annual	1.6E-03	0.24	Maximum 1st highest[g]
Formaldehyde (CAS# 50-00-0)	Annual	5.1E-04	0.077	Maximum 1st highest[g]
Dioxins and Furans combined taken as 2,3,7,8 tetrachlorinated dibenzo-p-dioxins CAS# 1746-01-6)	Annual	1.5E-10	2.2E-08	Maximum 1st highest[g]
1,1,2,2 Tetrachloroethane (CAS# 79-34-5)	Annual	1.1E-05	0.017	Maximum 1st highest[g]
Vinyl chloride (CAS# 75-01-4)	Annual	9.4E-04	0.14	Maximum 1st highest[g]
Arsenic (CAS# 7440-38-2)	Annual	1.5E-06	2.3E-04	Maximum 1st highest[g]
Beryllium (CAS# 440-41-7)	Annual	2.8E-05	4.2E-03	Maximum 1st highest[g]
Cadmium (CAS# 7440-43-9)	Annual	3.7E-06	5.6E-04	Maximum 1st highest[g]
Nickel (CAS# 7440-02-0)	Annual	2.7E-05	4.2E-03	Maximum 1st highest[g]

[a] IDAPA 58.01.01.585 and 58.01.01.586
[b] Pounds per hour
[c] Increment for acceptable ambient concentration/acceptable ambient concentration for carcinogens
[d] Micrograms per cubic meter
[e] *The maximum 1st highest modeled value is always used to establish TAPs compliance*
[f] Chemical abstract service
[g] Concentration at any modeled receptor, not to be exceeded in any calendar year

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2.2 Background Concentrations

Ambient background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Default background concentrations for rural/agricultural areas were used in the modeling analyses and are listed in Table 4. Nitrogen oxides (NO_x), carbon monoxide (CO), PM_{10} and sulfur dioxide (SO_2) were included in the NAAQS modeling analyses. The TAPs increments do not have any ambient background concentrations.

Table 4. BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
PM_{10}[b]	24-hour	73
	Annual	26
Nitrogen dioxide (NO_2)	Annual	17
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO_2)	3-hour	34
	24-hour	26
	Annual	8

[a]Micrograms per cubic meter
[b]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers

3.0 MODELING IMPACT ASSESSMENT

3.1 Modeling Methodology

Table 5 provides a summary of the modeling parameters used in the DEQ verification analyses.

Table 5. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Additional Description
Model	ISCS3-PRIME/BEE-LINE BEEST GUI[a]	ISC3P Version 04629/BEEST Version 9.48 (short-term criteria air pollutants)
Meteorological data	1987-1991	Spokane surface and upper air data. Wind directions were adjusted by the applicant by altering them 45 degrees clockwise to account for terrain conditions at the Grangeville site compared to Spokane.
Terrain	Considered	Receptor 3-dimensional coordinates were obtained from USGS DEM files.
Building downwash	Downwash algorithm	Building dimensions obtained from modeling files submitted, and BPIP-Prime and ISCST3-Prime were used to evaluate downwash effects.
Receptor grid	Grid 1	25m spacing along property boundary and out to 100 meters
	Grid 2	50m spacing from 100 meters out to 200 meters
	Grid 3	100m spacing from 200 meters out to 500 meters
	Grid 4	250m spacing from 500 meters out to 2,000 meters
	Grid 5	500m spacing from 2,000 meters out to 6,000 meters

[a]Graphic user interface

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

3.1.1 Modeling Protocol

A protocol was submitted by Chris Johnson, Consultant, on behalf of Bennett, to DEQ prior to submission of the application, as required by IDAPA 58.01.01.213.01.c. Written approval of the modeling protocol, with comments on modeling methodology, was issued by Kevin Schilling, Modeling Coordinator, by email dated September 13, 2005. Modeling was conducted using methods and data presented in the modeling protocol and the *State of Idaho Air Quality Modeling Guideline*.

3.1.2 Model Selection

ISCST3-Prime was used by Bennett to conduct the ambient air analyses. ISCST3-Prime is the recommended model for this instance, and the Prime algorithm accounted for wind-induced downwash effects due to structures at the site.

Modeling results submitted by the applicant were generated using an outdated version of ISCST3-Prime (version 01228). DEQ re-ran the analyses using the current version of ISCST3-Prime (version 04269).

3.1.3 Meteorological Data

Spokane surface and upper air meteorological data were used for the Bennett site in Grangeville. The Spokane meteorological data contains wind field data which is not representative of the direction of wind patterns that exist at the Grangeville site. The consultant for Bennett modified the windfield pattern by altering the Spokane data by 45 degrees clockwise to account for the difference in the local terrain that affects the wind directions.

3.1.4 Terrain Effects

The modeling analyses submitted by Bennett considered elevated terrain. The actual elevation of each receptor was determined using United Geological Survey (USGS) digital elevation map (DEM) files. DEQ's verification analyses imported the digital elevation map data in one of the modeling runs.

3.1.5 Facility Layout

DEQ verified proper identification of the facility boundary and buildings on the site by comparing the modeling input to a facility plot plan and a scaled aerial photograph of the area submitted with the application. A scaled facility plot plan with all existing and proposed emissions point and area sources was not included in the application. The aerial photograph of the site included the location of several sources. The locations and name designations of the emission points were not included on the facility aerial map, and this map did not cover the entire facility property within the ambient air boundary.

The locations of the remainder of the sources were not verified by DEQ. Bennett's modeling submittal included the location of all existing and proposed sources of emissions and structures in the BPIP and source files, and should be used to identify the location and stack parameters once the facility construction is completed. The stack parameters and locations used by Bennett in their modeling demonstration are listed in Section 3.3, Tables 8, 9, and 10 of this memorandum.

Appendix A of this memorandum contains two aerial photographs of the Bennett facility and the surrounding area. The aerial photographs date back to 2004.

3.1.6 Building Downwash

Plume downwash effects caused by structures present at the facility were accounted for in the modeling analyses. The Building Profile Input Program-Prime (BPIP-Prime) algorithm was used by the applicant to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for ISCST3-Prime. ISCST3-Prime identified the effects of structure-induced downwash on predicted ambient impacts. DEQ's verification modeling also used BPIP-Prime and ISCST3-Prime. The February 27 modeling submittal included a correction to the missing base elevation for the Sawmill Annex building.

3.1.7 Ambient Air Boundary

Bennett revised the facility's ambient air boundary by incorporating additional land purchased by the company following the issuance of this facility's original PTC. According to the hand-drawn map included in Appendix A of the application's modeling report, Bennett's current property size is approximately 253.5 acres, and is surrounded in part by City of Grangeville, a trailer court, and at least two other privately held parcels of property. The facility aerial map does not cover the entire area denoted as ambient air in the application. The areas not included on the aerial map are primarily the eastern and western-most portions of the facility. According to the application, portions of the facility restrict public access with a fence. The facility's employees restrict access by any member of the public while the facility is operating, and a security officer restricts access while the facility is not operating.

DEQ's comments on the modeling protocol did not include any issues on the ambient air boundary, and therefore, were approved as submitted for this project. Please refer to Appendix A of this memorandum to view aerial photographs of the Bennett site, and the surrounding land use as it existed in 2004. The ambient air boundary was represented in Bennett's electronic modeling files rather than on a scaled plot plan.

3.1.8 Receptor Network

The receptor grids used by Bennett met the minimum recommendations specified in the State of Idaho Air Quality Modeling Guideline, and DEQ determined the receptor spacing used was sufficient to reasonably resolve maximum modeled concentrations. DEQ verification analyses were conducted using the same receptor grid.

3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for DEQ verification modeling:

- All modeled criteria and toxic air pollutant (TAP) emissions rates were equal to or greater than the Bennett facility's emissions calculated in the PTC application or the permitted allowable rate.

- Bennett specifically requested that the Wellons boiler be allowed to operate at a steam production rate of 80,000 lb/hr. The modeling analyses submitted by Bennett in the February 24 and 27 submittals supported this operating rate for all TAPs. The applicant's modeling was based on the incremental increase between annual requested boiler steam production to the level already permitted. The average hourly TAP emission rate for most TAPs was conservatively estimated by calculating emissions assuming 8760 hrs of operation, then calculating the hourly emission rate modeled by dividing by 8,400 hours per year. The applicant then modeled these hourly emissions over 8,760 hours per year. The acetaldehyde, formaldehyde, and arsenic TAPs were modeled with actual emissions based upon 8760 hours per year of an increase in operation of the boiler to at or slightly above maximum design rated capacity, as described below.

- Bennett modeled acetaldehyde, formaldehyde, and arsenic emissions from the boiler at emission rates of 0.0509, 0.263, and 0.00129 lbs/hr respectively, corresponding to boiler operating rates of 537,209 MMBtus/yr, 523,609 MMBtus/yr, and 515,251 MMBtus/yr respectively. Compliance with the applicable AACCs for each of those TAPs was demonstrated at those emission rates. The boiler's unrestricted potential woodwaste combustion is listed as 1,014,001 MMBtu/yr. Boiler operations were previously permitted at 498,750 MMBtu/yr. Therefore, an increase of 515,251 MMBtu/yr would represent boiler operations at the maximum design rated capacity, according to the information provided in the emissions inventory.

- The formaldehyde emissions from the drying kilns were modeled using the entire 250 MMbf/yr facility-wide lumber throughput and an average formaldehyde emission factor of 2.185 lb/MMbf that reflects the wood species Bennett intends to dry in the kilns.

Annual TAP emission rates were used as provided by Bennett in the updated emission estimate spreadsheet (rev7y) received by DEQ on February 24, 2006.

- Bennett's application did not reflect worst-case assumptions for any wood species that may be processed at the facility. Bennett used assumed wood species throughputs of 50% white fir, 35% Douglas fir, and 15% ponderosa pine. Applying the assumed percentages of wood species resulted in Bennett's average formaldehyde emission factor of 2.185 lb formaldehyde per million board feet (lb/MMbf). Processing of lodgepole pine was not represented by Bennett in this project's emission inventory. The emission factor for formaldehyde emissions from drying lodgepole pine is 4.0 lb/MMbf. Methanol, and formaldehyde emission factors are dependant upon the wood species. Therefore, this is a controlled emission rate scenario.

DEQ verified that the formaldehyde emissions would not exceed the AACC increment by assuming that all 190 MMbf/yr of lumber processed in the drying kilns is ponderosa pine. The PTC application and DEQ's verification analysis did not account for the true worst-case specie of wood for formaldehyde emissions. Lodgepole pine is the worst-case specie for formaldehyde emissions; with an emission factor of 4.0 lb formaldehyde/MMbf. Ponderosa pine's formaldehyde emission factor estimates emissions at 2.9 lb/MMbf. These emissions factors are listed in PTC No. P-040214, issued July 29, 2005. Therefore, the scenario presented in the application still contains an assumed level of emissions control with regard to potential emissions.

For the short term criteria air pollutant ambient impacts, for most sources, Bennett modeled emission rates that were 120% of the average emission rates. The exceptions to this were the boiler, which was modeled at the emission rate corresponding to the rated design capacity of the boiler for all criteria air pollutants (SO_2, NO_x, and CO), cyclone 11 controlled by a baghouse (CY11BH), and all volume sources. CY11BH and the volume sources were modeled at the average PM_{10} emission rates. DEQ performed verification modeling with the volume sources scaled to 120% of the average hourly emission rates. Ambient impacts for the 24-hour PM_{10} NAAQS increased by 1.8 $\mu g/m^3$, and NAAQS compliance would still be demonstrated using the same design concentration selection method employed in Bennett's analysis (highest 2nd high value out of the individual five year set of modeling runs), and 1.5 $\mu g/m^3$ for the highest 6th high value from a concatenated five year set of modeling runs.

Tables 6 and 7 list the criteria air pollutant emissions rates for sources included in the dispersion modeling analyses for short term and annual averaging periods, respectively. Daily emissions were modeled by Bennett for 24 hours. Annual emissions were modeled over 8,760 hours per year.

Table 6. MODELED CRITERIA SHORT-TERM EMISSIONS RATES

Source Id	Description	Emission Rates (lb/hr[e])			
		PM_{10}[a]	NO_2[b]	SO_2[c]	CO[d]
Point Sources					
BOILER	Wellons Boiler	6.600	28.94	27.2	23.15
KILN3N	Kiln 3 North Vent	0.45143	0.0	0.0	0.0
KILN3C	Kiln 3 Center Vent	0.45143	0.0	0.0	0.0
KILN3S	Kiln 3 South Vent	0.45143	0.0	0.0	0.0
KILN2N	Kiln 2 North Vent	0.45143	0.0	0.0	0.0
KILN2C	Kiln 2 Center Vent	0.45143	0.0	0.0	0.0
KILN2S	Kiln 2 South Vent	0.45143	0.0	0.0	0.0
KILN1N	Kiln 1 North Vent	0.45143	0.0	0.0	0.0
KILN1C	Kiln 1 Center Vent	0.45143	0.0	0.0	0.0
KILN1S	Kiln 1 South Vent	0.45143	0.0	0.0	0.0
KILN4N	Kiln 4 North Vent	0.45143	0.0	0.0	0.0
KILN4C	Kiln 4 Center Vent	0.45143	0.0	0.0	0.0
KILN4S	Kiln 4 South Vent	0.45143	0.0	0.0	0.0
KILN5N	Kiln 5 North Vent	0.45143	0.0	0.0	0.0
KILN5C	Kiln 5 Center Vent	0.45143	0.0	0.0	0.0
KILN5S	Kiln 5 South Vent	0.45143	0.0	0.0	0.0
CY11BH	Cyclone 11controlled by a baghouse	0.020	0.0	0.0	0.0
CY12	Cyclone 12	0.620	0.0	0.0	0.0
CY41	Cyclone 41	0.001	0.0	0.0	0.0
CY71	Cyclone 71	0.590	0.0	0.0	0.0
CY72BH	Cyclone 72 controlled by a baghouse	0.270	0.0	0.0	0.0
CY73	Cyclone 73	1.680	0.0	0.0	0.0
Area Sources					
TBOIBRK	Deco bark to trucks	0.320	0.0	0.0	0.0
TOUTCHIP	Chips to trucks	0.579	0.0	0.0	0.0
TOUTSAWD	Dust cyclone to trucks	0.240	0.0	0.0	0.0
STYARD	Yard waste pile	0.055	0.0	0.0	0.0
DEBARKER	Debarker and defect saw	0.020	0.0	0.0	0.0
MERCHDZR	Merchandizer saw	0.370	0.0	0.0	0.0
TREFYARD	Yard waste	0.070	0.0	0.0	0.0
TBOIHOG	Filing room dust	0.205	0.0	0.0	0.0
TBOIFEED	Hog feed to boiler	0.081	0.0	0.0	0.0
TPLNCHP	Chips to trucks	0.100	0.0	0.0	0.0
TPLNFIN	Fines to trucks	0.130	0.0	0.0	0.0
DISCSCR	Disc screen	0.279	0.0	0.0	0.0
TARGETX	Target box	0.158	0.0	0.0	0.0
Volume Sources					
CINF	Incoming log conveyors	0.280	0.0	0.0	0.0
CREF	Refuse line	0.0023	0.0	0.0	0.0
TINF	Outside log infeed system And drop to reject log bunk	0.280	0.0	0.0	0.0
TREFREJ	Sawmill cyclone to dust bin; hog reject line; and cyclone to outside hog	0.0065	0.0	0.0	0.0
TREFIN	Log infeed line; Canter, DLI line	0.010	0.0	0.0	0.0
TREFLIN	Saw waste main refuse volume	0.410	0.0	0.0	0.0
TROSEBUD	Rosebud shavings	0.090	0.0	0.0	0.0
STASH		0.044	0.0	0.0	0.0

[a]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[b]Nitrogen dioxide
[c]Sulfur dioxide
[d]Carbon monoxide
[e]Pounds per hour

Table 7. MODELED CRITERIA ANNUAL EMISSIONS RATES

Source Id	Description	Emission Rates (lb/hr[e])			
		PM_{10}[a]	NO_x[b]	SO_2[c]	CO[d]
Point Sources					
BOILER	Wellons Boiler	6.600	28.94	27.2	23.15
KILN3N	Kiln 3 North Vent	0.377	0.0	0.0	0.0
KILN3C	Kiln 3 Center Vent	0.377	0.0	0.0	0.0
KILN3S	Kiln 3 South Vent	0.377	0.0	0.0	0.0
KILN2N	Kiln 2 North Vent	0.377	0.0	0.0	0.0
KILN2C	Kiln 2 Center Vent	0.377	0.0	0.0	0.0
KILN2S	Kiln 2 South Vent	0.377	0.0	0.0	0.0
KILN1N	Kiln 1 North Vent	0.377	0.0	0.0	0.0
KILN1C	Kiln 1 Center Vent	0.377	0.0	0.0	0.0
KILN1S	Kiln 1 South Vent	0.377	0.0	0.0	0.0
KILN4N	Kiln 4 North Vent	0.377	0.0	0.0	0.0
KILN4C	Kiln 4 Center Vent	0.377	0.0	0.0	0.0
KILN4S	Kiln 4 South Vent	0.377	0.0	0.0	0.0
KILN5N	Kiln 5 North Vent	0.377	0.0	0.0	0.0
KILN5C	Kiln 5 Center Vent	0.377	0.0	0.0	0.0
KILN5S	Kiln 5 South Vent	0.377	0.0	0.0	0.0
CY11BH	Cyclone 11 controlled by a baghouse	0.020	0.0	0.0	0.0
CY12	Cyclone 12	0.520	0.0	0.0	0.0
CY41	Cyclone 41	0.001	0.0	0.0	0.0
CY71	Cyclone 71	0.490	0.0	0.0	0.0
CY72BH	Cyclone 72 controlled by a baghouse	0.220	0.0	0.0	0.0
CY73	Cyclone 73	1.400	0.0	0.0	0.0
Area Sources					
TBOIBRK		0.270	0.0	0.0	0.0
TOUTCHIP		0.479	0.0	0.0	0.0
TOUTSAWD		0.200	0.0	0.0	0.0
STYARD		0.046	0.0	0.0	0.0
DEBARKER	Debarker and defect saw	0.020	0.0	0.0	0.0
MERCHDZR	Merchandizer saw	0.310	0.0	0.0	0.0
TREFYARD		0.050	0.0	0.0	0.0
TBOIHOG		0.171	0.0	0.0	0.0
TBOIFEED		0.068	0.0	0.0	0.0
TPLNCHP		0.080	0.0	0.0	0.0
TPLNFIN		0.110	0.0	0.0	0.0
DISCSCR	Disc screen	0.229	0.0	0.0	0.0
TARGETX	Target box	0.129	0.0	0.0	0.0
Volume Sources					
CINF	Incoming log conveyors	0.280	0.0	0.0	0.0
CREF	Refuse line	2.30E-03	0.0	0.0	0.0
TINF	Outside log infeed system And drop to reject log bunk	0.280	0.0	0.0	0.0
TREFREJ	Sawmill cyclone to dust bin; hog reject line; and cyclone to outside hog	0.007	0.0	0.0	0.0
TREFIN	Log infeed line; Canter, DLI line	0.010	0.0	0.0	0.0
TREFLIN	Saw waste main refuse volume	0.410	0.0	0.0	0.0
TROSEBUD	Rosebud shavings	0.090	0.0	0.0	0.0
STASH		0.044	0.0	0.0	0.0

[a]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[b]Nitrogen dioxide
[c]Sulfur dioxide
[d]Carbon monoxide
[e]Pounds per hour

Table 8 lists the modeled TAP emissions rates for the proposed modification project. The project, as defined in the PTC application, is subject to compliance with the TAPs increments. Daily emissions were modeled by Bennett for 24 hours. Annual emissions were modeled over 8,760 hours per year.

Table 8. MODELED TOXIC AIR POLLUTANT EMISSIONS RATES

Pollutant	Wellons Boiler[a]		Lumber Drying Kilns (aggregated emissions)[d]	
	(lb/hr)[b]	(T/yr)[c]	(lb/hr)	(T/yr)
Acetaldehyde	0.0509	0.229	0.22	0.97
Acrolein	0.235	1.0	0.0	0.0
Benzene	0.247	1.1	0.0	0.0
Benzo(a)pyrene	1.53E-04	6.7E-04	0.0	0.0
Carbon tetrachloride	2.65E-03	1.2E-02	0.0	0.0
Chloroform	1.65E-03	7.2E-03	0.0	0.0
1,2-Dichloroethane	1.71E-03	7.5 E-03	0.0	0.0
Dichloromethane	1.71E-02	0.075	0.0	0.0
Formaldehyde	0.263	1.15	0.065	0.285
Hydrogen Chloride	1.12	4.9	0.0	0.0
2,3,7,8-Tetrachlorodibenzo-p- dioxins	5.06E-10	2.2 E-9	0.0	0.0
2,3,7,8-Tetrachlorodibenzo-p- furans	5.29E-09	2.3E-08	0.0	0.0
Tetrachloroethane	2.24E-03	9.8 E-03	0.0	0.0
Vinyl chloride	1.06E-04	4.6E-03	0.0	0.0
Arsenic	1.294E-03	5.7E-03	0.0	0.0
Beryllium	6.47E-05	2.8E-04	0.0	0.0
Cadmium	2.41E-04	1.19E-03	0.0	0.0
Nickel	1.94E-03	8.5E-03	0.0	0.0

[a]Bennett submitted a revised emission estimate spreadsheet to address TAP emissions from the lumber drying kilns and the boiler initially on January 12, 2006, then again on February 24, 2006.
[b]Pounds per hour
[c]Tons per year
[d]All TAPs emitted by the lumber drying kilns were split evenly between each of the 15 modeled kiln vents (divide the aggregated emissions rates by 15 to derive individual vent emission rates).

3.3 Emission Release Parameters

Table 9 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. Values used in the analyses appeared reasonable and within expected ranges. Additional documentation /verification of these parameters was not required.

Tables 10 and 11 provide emission release parameters used in the modeling of area and volume sources, respectively. DEQ did not perform an in-depth review of the area and volume sources release parameters.

Bennett modeled the increase in acetaldehyde emissions using fifteen individual kiln vents. The exhaust vents for all kilns have coordinates representing the north end, center, and south end of a roof vent of each of five kilns as pseudo-stacks consistent with the modeling protocol and comments by Kevin Schilling, Stationary Source Modeling Coordinator, DEQ, during modeling protocol review.

Table 9. POINT SOURCE STACK PARAMETERS

Release Point	Source Type	X UTM[a] Coordinate (m)[b]	Y UTM Coordinate (m)	Source Base Elevation (m)	Stack Height (m)	Modeled Stack Diameter (m)	Stack Gas Flow Temperature (K)[c]	Stack Gas Flow Velocity (m/sec)[d]
BOILER	Point	566226	5087808	991.9	21.79	1.472	449.82	6.371
KILN1N	Point	566224.0	5087719.1	991.7.	7.01	1.067	344.26	0.803
KILN1C	Point	566224.0	5087710.3	991.6.	7.01	1.067	344.26	0.803
KILN1S	Point	566224.0	5087701.4	991.4.	7.01	1.067	344.26	0.803
KILN2N	Point	566236.7	5087719.8	991.1.	7.01	1.067	344.26	0.803
KILN2C	Point	566236.7	5087710.0	991.0.	7.01	1.067	344.26	0.803
KILN2S	Point	566236.7	5087701.1	991.0.	7.01	1.067	344.26	0.803
KILN3N	Point	566249.5	5087718.5	990.6.	7.01	1.067	344.26	0.803
KILN3C	Point	566249.5	5087709.7	990.6.	7.01	1.067	344.26	0.803
KILN3S	Point	566249.5	5087700.8	990.9.	7.01	1.067	344.26	0.803
KILN4N	Point	566262.5	5087718.2	990.5	7.01	1.067	344.26	0.803
KILN4C	Point	566262.5	5087709.4	990.6	7.01	1.067	344.26	0.803
KILN4S	Point	566262.5	5087700.5	990.6	7.01	1.067	344.26	0.803
KILN5N	Point	566274.9	5087717.9	990.3	7.01	1.067	344.26	0.803
KILN5C	Point	566274.9	5087709.1	990.5	7.01	1.067	344.26	0.803
KILN5S	Point	566274.9	5087700.2	990.6	7.01	1.067	344.26	0.803
CY11BH	Point	566226	5087808	991.9	7.92	2.307	293.15	4.289
CY12	Point	566258	5087719	990.5	5.49	0.816	293.15	11.621
CY41	Point	566258	5087710	990.6	4.27	8.230	293.15	0.038
CY71	Point	566258	5087701	990.6	16.08	0.762	293.15	1.695
CY72BH	Point	566241	5087719	990.8	7.60	0.762	293.15	28.562
CY73	Point	566241	5087710	990.8	22.59	1.372	293.15	3.833
KILN5S	Point	566244	5087701	990.9	7.0104	1.0668	344.26	0.803
KILN6N	Point	566224	5087719	991.7	7.0104	1.0668	344.26	0.803
KILN6C	Point	566224	5087710	991.6	7.0104	1.0668	344.26	0.803
KILN6S	Point	566224	5087701	991.4	7.0104	1.0668	344.26	0.803

[a]Universal transverse mercator
[b]Meters
[c]Kelvin
[d]Meters per second

Table 10. AREA SOURCE RELEASE PARAMETERS

Release Point	Easting X UTM[a] Coordinate (m)[b]	Northing Y UTM Coordinate (m)	Source Base Elevation (m)	Release Height (m)	Easterly Length (m)	Northerly Length (m)	Stack Gas Flow Velocity (m/sec)[c]	Angle From North (degree)	Vertical Dimension (m)
TBOIBRK	566374.69	5087827.5	987.4	4.572	2.44	2.44	0	0	0
TOUTCHIP	566452.69	5087736	993	4.572	2.44	2.44	0	0	0
TOUTSAWD	566452.69	5087724.5	993.2	4.572	2.44	2.44	0	0	0
STYARD	566135.62	5087913	992.9	1.8288	91.44	91.44	0	0	0
DEBARKER	566475.5	5087876.5	989	6.096	2.44	2.44	0	0	0
MERCHDZR	566475.44	5087888.5	988.9	6.096	2.44	2.44	0	0	0
TREFYARD	566379.25	5087887	986.3	0.9144	1.83	0.91	0	0	0
TBOIHOG	566374.94	5087885	986.3	1.8288	1.83	1.83	0	0	0
TBOIFEED	566285.94	5087809	988.6	3.6576	1.52	1.52	0	0	0
TPLNCHP	566100.62	5087703.5	990.2	4.572	3.05	3.05	0	0	0
TPLNFIN	566116.62	5087703.5	991	4.572	3.05	3.05	0	0	0
DISCSCR	566372.12	5087883	986.3	1.5545	3.05	0.91	0	0	0

[a]Universal transverse mercator
[b]Meters
[c]Meters per second

Table 11. VOLUME SOURCE RELEASE PARAMETERS

Release Point	Easting X UTM[a] Coordinate (m)[b]	Northing Y UTM Coordinate (m)	Source Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)
CINF	566476.69	5087883	989	4.8768	8.5039	6.8048
CREF	566463.44	5087912	988.5	4.8768	0.7803	6.8048
TINF	566476.69	5087883	989	0.6096	8.5039	6.8048
TREFREJ	566480.5	5087873.5	989.1	2.4384	0.2804	6.8048
TREFIN	566471.94	5087900	988.8	0.9144	0.2804	6.8048
TREFLIN	566425.06	5087900.5	987.4	1.8288	0.2499	6.8048
TROSEBUD	566151.38	5087747.5	994.4	0.9144	0.7315	3.59
STASH	566247	5087809.5	990.2	0.6096	0.2804	9.2141

[a]Universal transverse mercator
[b]Meters
[c]Meters per second

3.4 Results for Full Impact Analyses

A significant contribution analysis was not submitted for this application. Bennett submitted a full impact analysis for the proposed modification project. TAPs compliance was evaluated for the incremental increase in emissions that would be caused by the proposed process production increase and new process emissions units.

The results of DEQ's verification analyses of the unit emission rate (1.0 lb/hr) modeling run are shown in Table 12.

Table 12. COMPARISON OF UNIT EMISSION RATE DESIGN CONCENTRATIONS

Averaging Period	Bennett's Design Concentration (μg/m³)[a]	DEQ's Verification Analyses Design Concentration (μg/m³)
1-hour	9.62	9.62
3-hour	4.79	4.79
8-hour	3.00	2.97
24-hour	1.44	1.42 (highest 2nd high for criteria air pollutants) 1.58 (highest 1st high for TAPs)
Annual	0.177	0.185

[a]Micrograms per cubic meter

Results of Bennett's submitted full impact analyses and DEQ's verification analyses are shown in Table 13. As shown, DEQ's 24-hour verification analyses indicated lower impacts than Bennett's analyses, and matched Bennett's annual predicted ambient impact for PM_{10}. DEQ's results for the other criteria air pollutants which are based on the design concentration for each averaging period multiplied by the boiler's emission rate for that averaging period. The results for SO_2, CO, and NO_2 were approximately 23% of the design concentration values presented by Bennett.

Table 13. RESULTS OF FULL IMPACT ANALYSES

Pollutant	Averaging Period	Modeled Design Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[c]	24-hour	70.0 (58.2)[g]	73	143.0 (131.2)[g]	150	95.3
	Annual	11.2 (11.2)	16	27.2	50	54.4
SO_2[d]	3-hour	571 (130.2)	34	605	1,300	46.5
	24-hour	171.5 (38.5)	26	197.5	365	54.1
	Annual	21.1 (5.0)	8	29.1	80	36.4
CO[e]	1-hour	975 (222.7)	3600	4575	40,000	11.4
	8-hour	304 (68.9)	2300	2604	10,000	26.0
NO_2[f]	Annual	22.4 (5.35)	17	39.4	100	39.4

[a]Micrograms per cubic meter
[b]National ambient air quality standards
[c]Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d]Sulfur dioxide
[e]Carbon monoxide85
[f]Nitrogen dioxide
[g]Values in parentheses were obtained from DEQ verification modeling using BPIP-Prime/ISC-Prime, which is the regulatory design concentration, which is the highest 6[th] high for PM_{10}, 24-hour average, the highest 2[nd] high for SO_2 and CO for 1-, 3-, 8-, and 24-hour averages. Annual averages use a design concentration of the highest 1[st] high.

Table 14 lists the maximum predicted TAP ambient impacts presented by Bennett and the results of DEQ's verification analyses for the proposed project. *Bennett's TAP impacts were obtained from Table* 6-3 of the application received on October 21, 2005, except for acetaldehyde, which was obtained from the modeling files received on January 13, 2006.

The results of DEQ's verification analyses correspond well to the values presented by Bennett. All predicted TAP ambient impacts are below the applicable AACs/AACCs for the proposed project using the project emission increase context.

DEQ verification analyses used the highest 1[st] high value for both 24-hour and annual TAPS. The highest 1[st] high design concentration for the 24-hour averaging period is 1.58 $\mu g/m^3$. Bennett may have used the highest 2[nd] high value of 1.44 $\mu g/m^3$ (1.42 $\mu g/m^3$, was obtained from DEQ's verification analyses for the highest 2[nd] high). The highest 1[st] high must be used for TAPs compliance.

Table 14. TOXIC AIR POLLUTANTS ANALYSIS RESULTS

Pollutant	Year	Averaging Period	Maximum Concentration ($\mu g/m^3$)[a]	Receptor Location East (m)[b]	North (m)	Elevation (m)	AAC/AAAC[c] ($\mu g/m^3$)	Percent of Limit
Non-Carcinogenic TAPs								
Acrolein	1990	24-hour	0.339 (0.372)	566,400	5,088,450	1008.9	12.5	2.7%
Hydrogen Chloride	1990	24-hour	1.61 (1.77)	566,400	5,088,450	1008.9	375	0.4%
Carcinogenic TAPs								
Acetaldehyde	1991	Annual	0.142 (0.142)	566,108.2	5,087,530	991.5	0.45	31.6%
Benzene	1990	Annual	0.0437 (0.0456)	566,817.7	5,087,928	990.3	0.121	36.4%
Benzo(a)pyrene	1990	Annual	2.7E-05 (2.82E-05)	566,817.7	5,087,928	990.3	3.0E-04	9.0%
Carbon Tetrachloride	1990	Annual	4.68E-04 (4.89E-04)	566,817.7	5,087,928	990.3	0.067	0.7%
Chloroform	1990	Annual	2.91E-04 (3.05E-04)	566,817.7	5,087,928	990.3	0.043	0.7%
1,2 Dichloroethane	1990	Annual	3.02E-04 (3.16E-04)	566,817.7	5,087,928	990.3	0.038	0.8%
Dichloromethane	1990	Annual	3.02E-03 (3.16E-03)	566,817.7	5,087,928	990.3	0.24	1.3%

Pollutant	Year	Averaging Period	Maximum Concentration ($\mu g/m^3$)[a]	Receptor Location				Percent of Limit
				East (m)[b]	North (m)	Elevation (m)	AAC/AAAC[c] ($\mu g/m^3$)	
Carcinogenic TAPs								
Formaldehyde	1991	Annual	0.07688 (0.0769) (0.0873)[e]	566,525	5,088,250	999.0	0.077	99.84% (113.4%)[e]
2,3,7,8-Tetra-chlorodibenzo (p) dioxins and furans[f]	1990	Annual	8.95E-11 (1.91E-10)	566,817.7	5,087,928	990.3	2.2E-08	0.4% (0.84%)
Tetrachloroethane	1990	Annual	3.95E-04 (4.14-04)	566,817.7	5,087,928	990.3	0.017	2.3%
Vinyl Chloride	1990	Annual	1.87E-04 (1.96E-04)	566,817.7	5,087,928	990.3	0.14	0.10%
Arsenic	1990	Annual	2.29E-04 (2.39E-04)	566,817.7	5,087,928	990.3	2.3E-04	99.5%
Beryllium	1990	Annual	1.14E-05 (1.19E-05)	566,817.7	5,087,928	990.3	4.2E-03	0.3%
Cadmium	1990	Annual	4.26E-05 (4.45E-05)	566,817.7	5,087,928	990.3	5.6E-04	7.6%
Nickel	1990	Annual	3.43E-04 (3.58E-04)	566,817.7	5,087,928	990.3	4.2E-03	8.2%

[a]Micrograms per cubic meter

[b]Meters

[c]Acceptable ambient concentration (non-carcinogens)/Acceptable ambient concentration for carcinogens

[d]Values in parentheses are DEQ verification analysis results, highest 1st high

[e]DEQ modeled the unrestricted potential emissions increase (boiler increased wood combustion of 515,251 MMBtu/yr, resulting in a formaldehyde emission rate of 0.259 lb/hr, and the kilns were evaluated with a 190 MMbf/yr increase based on lodgepole pine, resulting in a formaldehyde emission increase of 760 lb/yr, 0.0868 lb/hr, and 0.0072 lb/hr for each of the 12 kiln vents.

[f]Per IDAPA 58.01.01.586, dioxin and furan compliance must be established by combining dioxin and furan emissions as ONE TAP and the impacts must be evaluated using the EPA Interim Procedures for measuring risks... for chlorinated dibenzo-p-dioxins and dibenzofurans, EPA publication EPA/625/3-89/016, March 1989. The toxic equivalency factor (TEQ) for 2,3,7,8-tetrachlorodibenzo-p-dioxins is "1.0", and the TEQ for 2,3,7,8-tetrachlorodibenzo furans is "0.1". Each species' emission rate is multiplied by the TEQ value and the unit emission rate ambient design concentration to estimate that species ambient impact. Then the impacts for each species is added to determine the design ambient impact for dioxins and furans. This value is compared to the AACC for 2,3,7,8-tetrachlorodibenzo-p-dioxin of 2.2E-08 $\mu g/m^3$, annual average, to establish compliance.

4.0 CONCLUSIONS

The ambient air impact analysis submitted, in combination with DEQ's verification analyses, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.

DM/bf Permit No. P-050214

G:\Air Quality\Stationary Source\SS Ltd\PTC\Bennett Forest - Grangeville\Facility Draft\P-050214 BennettForProdGrangeville final modeling memo.doc

APPENDIX A

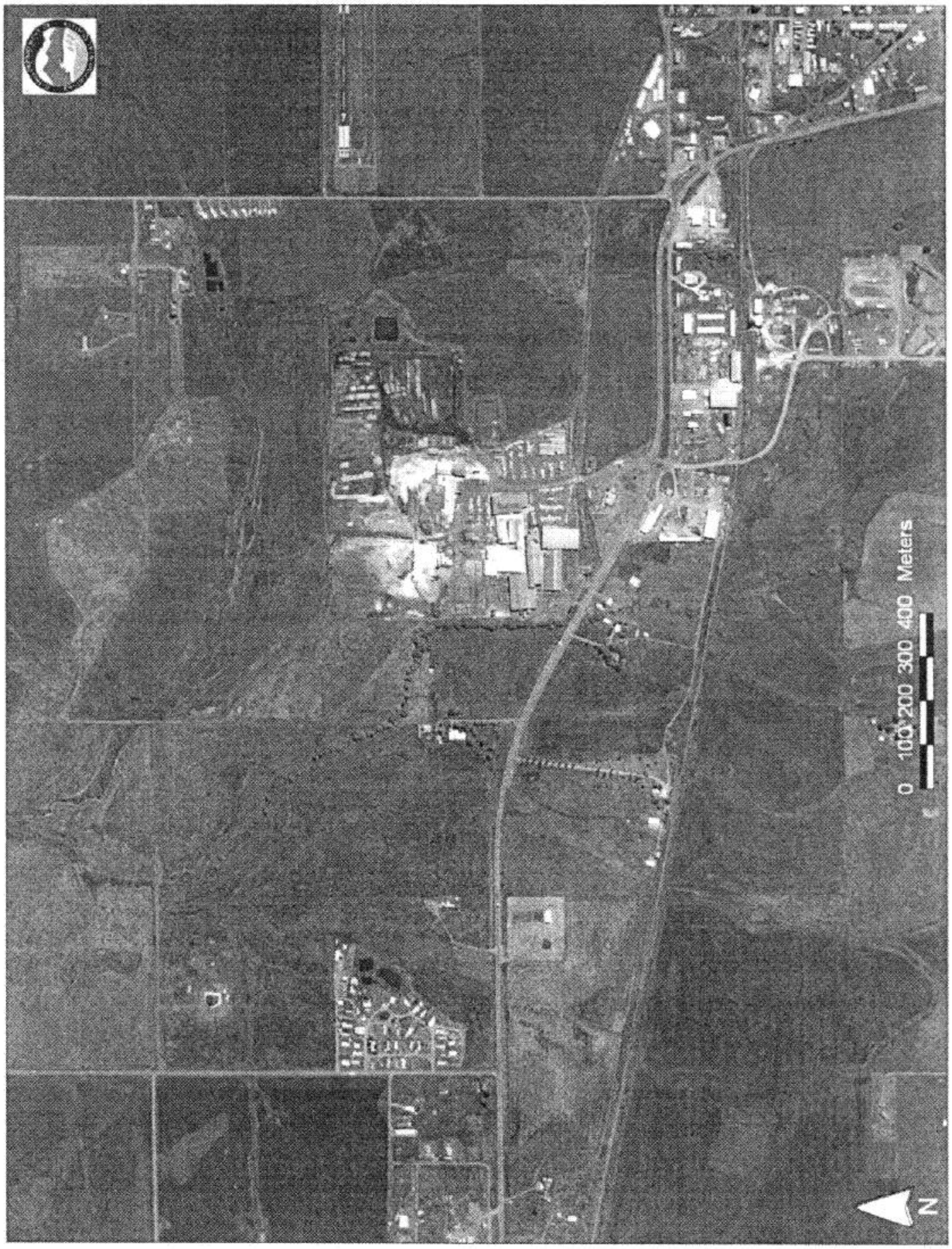
2004 AERIAL PHOTOGRAPHS OF

BENNETT FOREST INDUSTRIES SITE

AND SURROUNDING LAND USE

(2 images)


0 100 200 300 400 500 Meters
N



Modeling Memo – Bennett Forest Industries, Grangeville

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APPENDIX C

P-050214

AIRS Form

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: Bennett Forest Industries
Facility Location: Grangeville, ID
AIRS Number: 049-00003

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	A	B					A	U
NO_x	A	B					A	U
CO	A	B					A	U
PM_{10}	SM	B					SM	U
PT (Particulate)	A	B	X				A	U
VOC	A	SM					A	U
THAP (Total HAPs)	SM			N/A	SM		SM	U
			APPLICABLE SUBPART					
			Db					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, or each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

APPENDIX D

P-050214

Miscellaneous Information

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

04 OCT 2005

Reply To
Attn Of: AWT - 107

Michael Scott Atkison, CEO
Bennett Forest Industries
Rt. 1 Box 2L
Grangeville, Idaho 83503

Re: Fuel Usage Monitoring Requirement for an Exclusively Wood-Fired Boiler

Dear Mr. Atkison:

This determination is in response to a request submitted to the Environmental Protection Agency (EPA) by Bennett Forest Industries (BFI) dated June 16, 2005 regarding the fuel usage monitoring requirement of 40 CFR Part 60 Subpart Db, the Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (Subpart Db), as it applies to their source. BFI operates a 115 MMBtu/hr boiler that is exclusively fired with wood. This boiler is subject to Subpart Db. BFI is requesting clarification from EPA regarding the applicability of the requirement to record the amount of wood combusted each day and to calculate the annual capacity factor for wood as detailed in Subpart Db §60.49b(d). BFI has also proposed an alternate method for determining the amount of wood combusted.

BFI has asked if EPA can specify permit conditions regarding the fuel usage monitoring requirement. It is the role of the Idaho Department of Environmental Quality (IDEQ) to specify the permit conditions based on this determination. Therefore, EPA will refrain from specifying what those should be. EPA determines that if BFI is subject to the more stringent emission limit for particulate matter of 0.10 lb/million Btu and a restriction to combust only wood, the requirement to record the amount of wood combusted each day is not needed for the purposes of calculating the annual capacity factor, as required by Subpart Db §60.49b(d). EPA has made this determination after consultation with the Idaho Department of Environmental Quality (IDEQ) and EPA headquarters.

If BFI is required to monitor the fuel usage for some other reason, EPA has also determined that BFI's proposal to monitor the fuel usage based upon steaming rate is acceptable. The justifications for these determinations are described further below.

Background

Under Subpart Db §60.49b(d), the owner or operator of an affected facility shall record and maintain records of the amounts of each fuel combusted during each day and calculate the annual capacity factor individually for each fuel. The purpose of determining the annual capacity factor for each fuel is to determine what sections of Subpart Db apply to your source.

The annual capacity factor, as defined in 40 CFR §60.41b, is:

> "The ratio between the actual heat input to a steam generating unit from ... (each fuel) ..., during a calendar year and the potential heat input to the steam generating unit had it been operated for 8,760 hours during a calendar year at the maximum steady state design heat input capacity..." (emphasis added).

The annual capacity factor of wood is needed to determine which particulate matter limit you will be subject to, under §60.43b(c) of the Standard for Particulate Matter in Subpart Db. Based on this definition your annual capacity factor could be anywhere from zero to one for wood.

Under Subpart Db, there is an option for a less stringent limit if certain conditions are met, among them, the requirement to have an annual capacity factor of less than 30 percent for wood. If the annual capacity factor is greater than 30 percent for wood a more stringent emission limit for particulate matter of 0.10 lb/million Btu applies.

Determination

BFI states that the only fuel that will be burned is wood as required by section 3.6 of their Permit to Construct (Permit No. P-040214). Assuming the restriction to burn only wood is required by a federally enforceable permit, EPA can be assured that the annual capacity factors for all other fuels aside from wood will be zero. Therefore, there is no need to calculate the annual capacity factors for all fuels aside from wood. If BFI is subject to the more stringent limit for particulate matter of 0.10 lb/million Btu, there is also no need for BFI to calculate the annual capacity factor for wood.

Therefore, EPA determines that if BFI is subject to the more stringent emission limit for particulate matter of 0.10 lb/million Btu and a restriction to only combust wood, the requirement to record the amount of wood combusted each day is not needed for the purposes of calculating the annual capacity factor, as required by Subpart Db §60.49b(d).

BFI has indicated in conversations that there are physical difficulties in measuring the actual mass of the wood that they combust because it comes in various forms resulting from their operation as a lumber mill. Therefore, if BFI is required to monitor the fuel usage for some other reason, they have proposed an alternative plan for monitoring fuel usage. BFI has stated that they will have a steaming rate monitor required by their permit. The manufacturer of that steaming rate monitor is capable of also having a fuel usage monitor whose values are calculated from the steaming rate. The manufacturer has stated to BFI that they have used this monitor in other applications to document fuel usage for tax purposes, and have validation studies to document its accuracy. EPA has determined that considering your circumstances, if needed, this approach is acceptable for calculating the amount of wood combusted.

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If any circumstances change in the way you operate your boiler from that described in this letter, this determination will no longer be valid. If you have any further questions or concerns, contact Heather Valdez of the Region 10 Office of Air, Waste, and Toxics at (206) 553-6220 or valdez.heather@epa.gov.

Sincerely,

Jeff KenKnight, Manager
Federal and Delegated Air Programs Unit

cc: Carole Zundel, IDEQ